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JUN 80 E D MAYFIELD, R W WALTER

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(6) RELATIONSHIP BETWEEN THE INITIAL DUTY ASSIGNMENT AND SUCCESSIVE ASSIGNMENTS IN THE AIRCRAFT MAINTENANCE OFFICER CAREER FIELD (AFSC 4024).

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This research effort investigated some of the problems associated with training and assignment flexibility in the Aircraft Maintenance Officer Career Field. It was posited that many of the problems could be related to a perceived tendency for officers to be continually re-assigned to the Major Command to which the officer was initially assigned. The objective of the study was, therefore, to determine if, in fact, such an assignment tendancy existed. To accomplish this, an informational model was developed which allowed statistical comparisons between actual Aircraft Maintenance Officer assignment trends and 1) the expected trend based on Major Command proportions and 2) actual trends exhibited by other career fields. The analysis was based on large samples of AFMPC computer filed assignment histories. The results strongly suported the hypothesis that a trend did exist for Aircraft Maintenance Officers to be continually re-assigned to the Major Command of initial assignment.

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RELATIONSHIP BETWEEN THE INITIAL DUTY ASSIGNMENT AND SUCCESSIVE ASSIGNMENTS IN THE AIRCRAFT MAINTENANCE OFFICER CAREER FIELD (AFSC 4024)

A Thesis

Presented to the Faculty of the School of Systems and Logistics

of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the Requirements for the

Degree of Master of Science in Facilities Management

By

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June 1980

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and

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has been accepted by the undersigned on behalf of the faculty of the School of Systems and Logistics in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE IN FACILITIES MANAGEMENT

9 June 1980

Ronald D Blackledge
COMMITTEE CHAIRMAN

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CHAPTER I

INTRODUCTION

Background

In the complex and dynamic field of Air Force weapons systems, aircraft maintenance is of prime importance in retaining a mission capable force. In order to accomplish necessary aircraft maintenance, the proper training of maintenance personnel is essential to the Air Force. A proposed thesis research topic submitted to the Air Force Institute of Technology (AFIT) stated; ". . . education and training of maintenance people in the Air Force are accomplished in an unintegrated, pell-mell manner [16:17]." While performing a background investigation of this general maintenance research topic it became evident that there is a consensus among the organizations and personnel contacted that training and assignment problems exist, most particularly, in the Aircraft Maintenance Officer (AMO) career field, AFSC 402X, and that these problems degrade the aircraft maintenance capability of the Air Force. Further substantiation of this opinion was found in discussions with AFIT maintenance and logistics academic instructors, aircraft maintenance officers, the maintenance directorates of the Strategic Air Command (SAC), Tactical Air

Command (TAC), Military Airlift Command (MAC), and Air Force Manpower and Personnel Center (AFMPC) (4,13,7,1,5,3). Each organization and individual perceived different causes for similar problems. The similarities of each perception were that training improvement was needed as is increased assignment flexibility.

AFIT Instructors

A discussion with AFIT faculty experienced in Air Force aircraft maintenance training indicated that one problem in training is perceived to be the lack of adequate Air Force career training guidance for AMOs. Adequate guidance would provide a framework for several typical career progressions by identifying areas of experience desired by Air Force and by identifying education and training courses available to the AMO to prepare him for higher level management positions. The specific lack of such guidance, it is believed, has resulted in maintenance officers who are poorly prepared for advancement to higher levels of management and who are therefore limited in assignment potential (4).

Aircraft Maintenance Officers

In order to see if AMOs held the same perception of the problem, a small convenience sample of officers recently assigned to the 402X career field at the squadron level was taken, and it also indicated a perceived lack of

training guidance for AMOs (13). They believed that proper career development for AMOs can lead to senior management positions in the research and development arena, the logistics support arena, and the operations arena. However, because of the wide range of career possibilities and the complexities of the career field, they believed purposeful career planning early in the career was necessary. It was felt that Air Force training guidance would aid AMOs in career planning. A second perception of this sample was that assignment progression through the 402X field is limited by the Major Air Command (MAJCOM) of initial duty assignment. They indicated that the limitation is due to the specialized training required to maintain the weapons systems unique to the MAJCOM.

AFMPC

Officials of AFMPC also believe that a problem exists with the training of AMOs (7). However, these officials perceive the problem to be that the squadron level operating units are unable to provide adequate upgrade training to entry level (4021) AMOs. This concern has been heightened by recent Air Force action to raise manning levels in the 402X career field. By late 1980 the Air Force expects to have increased the number of AMOs by 23% of the current manning authorizations in order to fill shortages in the career field (7). While the basic

maintenance training of entrants into the field is accomplished by mandatory attendance of Air Training Command Aircraft Maintenance Officer Courses, the detailed, on-the-job training becomes the responsibility of the MAJCOM of initial duty assignment.

MAJCOMs

Officials from the directorates of maintenance for MAC, TAC, and SAC supported the AFMPC perceptions of the operating units' ability to provide training (5,3,1). Each of the MAJCOMs is currently investigating its ability to provide training to entry level AMOs. Although each MAJCOM is striving to deal with the training problems, their efforts are independent. Each command is unilaterally taking the following respective steps:

1. MAC has begun developing a command training guidance policy to assist and guide operating units in the initial training and development of entry level AMOs. MAC expects the first draft of the policy to be published in November 1979 (5).
2. TAC is investigating its training abilities and is preparing recommendations for the commander (3).
3. SAC has established an office to monitor the career development of AMOs. This office is responsible for assisting the operating unit in establishing and conducting training programs for entry level AMOs (1).

Literature Review

The independent approaches to aircraft maintenance training by the MAJCOMs reflect the guidance of AFM 66-1 which states that each local commander shall ". . . actively support a continuing proficiency training program . . . [10:2-1]" and that each Deputy Commander shall "Ensure that a comprehensive training program is established throughout the maintenance complex [9:1-2]." AFR 36-23 states that "Although, separate career development efforts of all echelons are encouraged, they must function within the overall management system to insure cohesive personnel actions [11:1-1]" and that "Management must provide guidance and opportunities for career development and create a climate that engenders growth [11:1-3]." The quotations just cited, taken in context with respective directives, outline an Air Force policy that fosters recognition of the specialized missions of the MAJCOMs. It places the primary responsibility of training with the MAJCOMs. The policy, however, emphasizes that while providing training (AMO training in this case), MAJCOMs must do so in a manner that meets the following objectives of the Air Force career management program:

1. To develop officer qualifications to meet Air Force needs. (Notice that this is distinctive from meeting MAJCOM needs.)

2. To provide the training and rotation of assignments to develop officer capabilities.
3. To ensure all officers have the opportunity to compete for positions which satisfy their career needs.
4. To ensure adequate information is available to allow each individual to plan his career (11:1-1).

The perceptions encountered during the background investigation all indicated beliefs that one or more of these career management objectives are not being met because of training and assignment practices. While no literature was found dealing directly with the effects of specialized AMO training on assignment potential, Williams, in a 1972 report on the effects of specialized training for Aircraft and Missile Maintenance Officers, concluded that specialized training causes loss of personnel assignment flexibility for the Air Force (15).

Delimitation

Both literature and interviews have thus established a consensus that a problem exists in the training and career progression of AMOs; however, several perspectives as to the nature of the problem have been found. Following good research principles, each perspective of the problem was stated. The explanatory hypothesis is one method for stating the perspectives encountered. As described by Emory, an explanatory hypothesis strongly implies or states

that the existence or change in one variable causes a change in another variable (2:31-32). The perspectives encountered, stated as explanatory hypotheses, follow:

	Cause	Leads to	Effect (or Conclusion)
1.	There is a lack of proper training for Aircraft Maintenance Officers.		There is a loss of assignment potential and flexibility for Aircraft Maintenance Officers.
2.	Training of Aircraft Maintenance Officers is accomplished in an unintegrated pell-mell manner.		Officers are unprepared for broad higher level management positions.
3.	Training, specialized to the MAJCOM, is given to the Aircraft Maintenance Officer on his initial duty assignment.		There is a trend for Aircraft Maintenance Officers to receive assignments in the MAJCOM of initial duty assignment.

As listed, the three explanatory hypotheses may be viewed as a hierarchy of abstraction relating problems in AMO training to future assignments. Moving down through the hierarchy of abstraction, the cause and effect relationship stated in each explanatory hypothesis moves from the abstract, or general, to the more specific. While the specific hypothesis is not the only possible result of the higher abstraction hypotheses, it is a reasonable extension of logic to a more specific claim. More to the point, it

reflects experience of people surveyed. The broadest hypothesis expresses the general consensus that there's something wrong in AMO training and that this must lead to a loss of assignment potential or flexibility for both the individual and the Air Force. More specifically the problem is seen as occurring in the fragmented and unintegrated programs in the Air Force which only trains an officer for his immediate maintenance jobs.

Finally, this parochial training in each MAJCOM would seemingly lead to each MAJCOM holding tightly to the resources it has trained, thus evidencing a high number of AMOs who remain in any particular MAJCOM for substantial parts of their careers. This line of reasoning thus establishes three hypotheses with each higher one resting conceptually on the one below it. The bottom hypothesis claims that the link between a particular MAJCOM's investment in training a person and their effort to keep them (evidenced in successful actions to keep people for repeat assignments) is related. If this is true, efforts at breaking the vicious circle (that leads to ultimate loss of assignment potential and flexibility) must start with recognizing that MAJCOM's reinforce their mistake of narrow training by allowing as little cross-command infusions of people as possible. The whole chain of logic thus is affected by the perception about repeat assignments.

Objectives

Research Hypothesis

The objective of this thesis is to test the research hypothesis: A trend exists for Aircraft Maintenance Officers to receive subsequent assignments in the MAJCOM of initial duty assignment.

Decision Rules

The following decision rules, posed as questions, were established to test the research hypothesis:

1. Does a statistical correlation exist between the MAJCOM of initial duty assignment and the MAJCOM of subsequent assignments?
2. If this correlation exists, can it be distinguished from a random correlation?
3. If this correlation exists and can be distinguished from a random correlation, does it conceptually indicate a trend for Aircraft Maintenance Officers to remain in the MAJCOM of initial duty assignment?

CHAPTER II

METHODOLOGY

Conceptual Model

The relationship between the MAJCOM of initial duty assignment of an AMO and the MAJCOM of subsequent duty assignments obviously must be investigated for AMOs having varied career lengths comprised of varied numbers of duty assignments. This led to grouping AMOs by the number of duty assignments in a career, the MAJCOM of the initial duty assignment, and the number of subsequent duty assignments that were in the MAJCOM of initial duty assignment. The partitioning of the population is graphically modeled in Figure 1.

Elements and Relationships

Elements

The "given" elements in this analysis are described and defined as follows:

MAJCOM: Major Air Command. For the purpose of this study only the major flying commands, MAC, SAC, TAC, and ATC were considered. If trends don't exist here, it makes little sense to look further.

AMO: Aircraft Maintenance Officer. AMOs were limited to those described in the population description.

Partitioning the Population

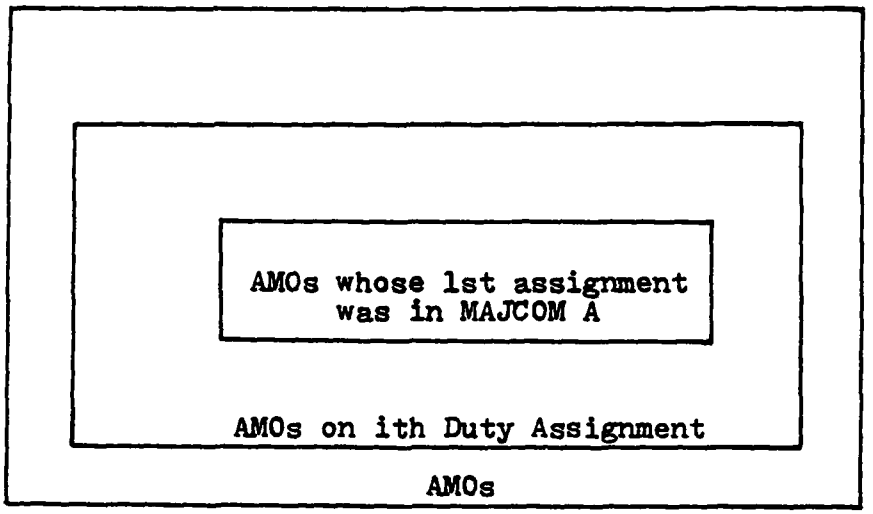


Fig. 1

AMO's that are exceptions to this description do occur and are treated later in this thesis.

Relationships

Duty Assignment: A tour of duty encompassing a time frame in which an AMO is assigned maintenance responsibilities for weapons systems of a particular unit and MAJCOM.

Variables

Within any given MAJCOM an AMO has duty assignments. Specifically we focus on two aspects of an assignment as parameters of this thesis, and they are classed as "variables". Note that since only correlation is sought, neither is classed as a dependent or independent variable per-se.

Number of Assignments in the MAJCOM of Initial Duty Assignment: The total number of duty assignments an AMO spent in the first MAJCOM to which he was assigned as an AMO.

Number of Assignments in the 402X Career Field: The total of assignments an AMO spent in the 402X career field.

Population Description

For this study, the population of interest consists of all those Air Force active duty personnel who currently hold a primary AFSC of 4024. This population insures the inclusion of AMOs whose primary duty in the Air Force is aircraft maintenance.

This population dictates that new entries into the AMO career field, AFSC 4021, are not included. It also dictates that officers assigned to the basic AMO training school, or "pipeline students", are not included. Also excluded are officers on career broadening assignments from other fields into the 4024 career field. The reason for

excluding the above categories is to insure that the population from which the sample is drawn truly represents the population of AMOs for which aircraft maintenance is a lengthy, career-related duty. That is, sufficient time had been spent in the field to warrant the title "Career Aircraft Maintenance Officer". This also allows sufficient duty time to permit inferences about any particular AMO's assignment trend.

New entries into the field, those officers with an AFSC of 4021, are excluded because they would, in all likelihood, be on the first assignment and would not have established any basis for an assignment trend. Pipeline students were excluded for similar reasons, not even having reached the first duty assignment. Officers on career broadening assignments from other fields are excluded because they, by definition, are only spending time in the AMO field to broaden their backgrounds for better performance within their own career field. The inclusion of the above exceptions in the sample could conceivably have biased any inferences about assignment trends in the AMO career field.

Ideally, a study of assignment trends in the AMO career field would include the assignment histories of all eligible officers who are now, or who have ever been, assigned to the 402X career field. However, the movement of

officers through the career field is a process which begins many years in the past and will continue many years into the future.

When taking a sample from a process, an assumption about the continuity of the process is made. That is, that the process does not change significantly from one time increment to the next so that a sample taken at a particular point in time is representative of the population both a "reasonable" distance into the past and into the future (14:188). This assumption applies to the assignment process of AMOs at least during the time period covered by the study sample. If one takes a point-in-time census of AMOs and compares it to a point-in-time census two years later, most of the individual members will be contained in both populations. The differences would be new entries into the field and losses from the field due to crosstraining, death, promotion to the next higher career AFSC, etc. Since the first census also contained new entries and losses via the same mechanisms, any descriptive statistical measurement of population characteristics would not be expected to be significantly different unless some dramatic policy change had occurred. It has not. So the case for a point in time sample of AMOs representing the current population is justifiable in both statistical theory and logical support.

Sample Source

The data used in this study are drawn from the computerized field records of the population. The field records are maintained at the Air Force Manpower and Personnel Center, Randolph AFB TX. The field records were supplied by a Palace Log career monitor according to the sample plan discussed later. The records were purged of information such as name, social security number, address, and phone number that could be used to identify an individual officer. Each field record in the sample, therefore, contains the following information:

1. Rank
2. History of all duty assignments as a USAF officer
3. MAJCOM of all duty assignments
4. Unit of all duty assignments
5. Positions held during all duty assignments

The above data contains sufficient information to quantify each of the variables listed.

Calculation of Minimum Sample Size

The goal of sampling is to select a large enough set in a population so that some trait or characteristic of that set may be accurately inferred to the population as a whole. In order to test the research hypothesis, the distribution of duty assignments between the MAJCOM of initial

duty assignment and other MAJCOM's is investigated for careers comprised of varying numbers of assignments. Since all officers in the population are on an assignment, the population is completely described by the sum of the sets of officers on second assignments plus those on third assignments plus those on fourth assignments, etc. Notice that officers on first assignments have previously been eliminated from the population (4021's). Each set may further be thought of as a population proportion comprised of the ratio of officers on a particular assignment to the total number of officers in the population. One key task then is to select a large enough total sample of officers such that the portion of officers in the smallest proportion has adequate statistical significance, given a desired confidence. Estimating the proper sample size is accomplished by straight forward use of statistical formulae once the desired accuracy, confidence level, and population proportion are known. See Appendix B. It is crucial to note that while the confidence level and accuracy are selected by the researcher, the population proportion must be obtained from the population.

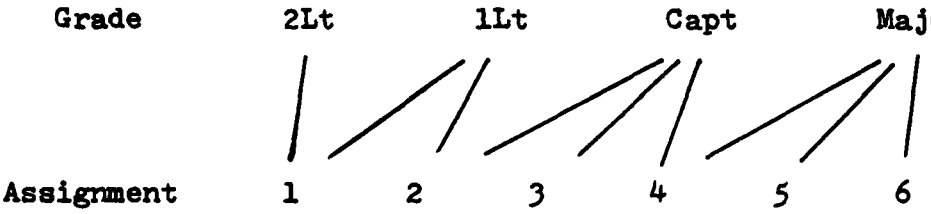
Since AFMPC computerized personnel records cannot be retrieved based on the number of assignments in a career, the population proportions of careers of various numbers of assignments are estimated based on an assumed

relationship between rank and career length. It is assumed that:

1. The mean length of a duty assignment is three years.
2. All officers in the sample have spent their entire careers in Aircraft Maintenance.
3. Average total commissioned time for a second lieutenant is 2 years.
   Average total commissioned time for a first lieutenant is from 2 to 4 years.
   Average total commissioned time for a captain is from 4 years to 11 years.
   Average total commissioned time for a major is from 11 to 16 years.
4. All second lieutenants are on 1st duty assignment
   All first lieutenants are on 1st or 2nd duty assignment
   All captains are on 2nd, 3rd, or 4th duty assignments
   All majors are on 4th, 5th, or 6th duty assignments.

The actual number of officers in each grade for the career field was obtained from AFMPC. From this information, the number of officers having careers of 2, 3, 4, 5, and 6 assignments was estimated by assuming that all second lieutenants were on first assignment and that half of the first lieutenants were on the first assignment and half on the second. Likewise, it was assumed that a third of the captains were on the second assignment; a third on the third assignment, and a third on the fourth assignment. Majors were assumed evenly divided among the fourth, fifth, and sixth assignments. See Figure 2. The number of officers estimated to be serving on each given assignment was divided by the number of officers in the population thus producing

Estimating Career Proportions



Officers on 1st assignment = 2Lt + 1/2 1Lt
2nd = 1/2 1Lt + 1/3 Capt/total officers
3rd = 1/3 Capt/total officers
4th = 1/3 Capt + 1/3 Major/total officers
5th = 1/3 Major/total officers
6th = 1/3 Major/total officers

$$\frac{2Lt + 1Lt + Capt + Major}{Total\ Officers} = 1$$

Fig. 2

the estimated population proportions of officers on each particular assignment. An estimated sample size was then calculated from the estimated population proportions. Since the formula for calculating the sample size results in a maximum sample size when the population proportion is equal to 0.5, the sample size resulting from the estimated population proportion nearest to 0.5 should be sufficient to also satisfy the remaining proportions.

For the AMO career field the sample estimate was based on a desired confidence interval half width of 1% at the 0.10 alpha level. These calculations, based on the

previous assumptions, allow us to work through the proportion analysis into a total sample number which is likely to contain appropriate proportional numbers. The total AMO sample thus derived is 1124. The reader should realize that the assumptions concerning proportions of various ranks being on any given assignment number is used only to calculate a sample size, hence any estimate errors relative to true numbers of AMO's on a given assignment number adversely affects only the sample size calculation. It is believed that potential error caused by this estimation process is small and would only affect the smallest proportion.

Working with the Sample

The sample is stratified by the grade of the officers in the current assignment. Stratification by grade in this study is an approximation to stratification by number of career assignments since stratification by number of career assignments is impractical. Grade stratification has a close correspondence to number of career assignments and is the closest classification readily obtainable from the computer files.

The sample is randomized using the last digit of the social security account number (SSAN), which is randomly distributed. The probability that any particular AMO has a SSAN ending with any one of 10 digits (0-9) is 0.10;

thus, each digit represents 10% of the population. Sufficient digits from 0 to 9, inclusive, are selected from a random table to produce a sample size equal to or exceeding the estimated required sample size. For estimating sample size an accuracy of 1%, and a confidence level of 0.10 were assumed.

Decision Criteria for Processing Data

The raw data extracted from personnel records are tabulated according to the variables listed in the sample plan. Prior to the start of correlations, the data were checked and adjusted for the following anticipated anomalies:

1. An Assignment from a MAJCOM to a unified or over seas command was considered an assignment to the MAJCOM having functional responsibility for the weapons system to which the AMO was assigned. Such an assignment, while not placing the AMO under the operational control of that MAJCOM, placed him under the functional procedures and functional control of the MAJCOM.
2. In the recent past, operational and functional responsibility for tactical airlift was transferred from TAC to MAC. It was anticipated that the change would manifest itself as a large, one-time shift in assignments from TAC to MAC occurring

within a short time period. All assignments to tactical airlift aircraft in TAC prior to the change of responsibility were considered as assignments in MAC.

3. Career broadening assignments for AMOs out of the 4024 career field were ignored. That is, an AMO's career length was reduced by the number of the career broadening assignments held. The nature and timing of career broadening assignments are temporary and variable. While such assignments are usually in an area of peripheral interest, they need not be directly related to the primary function of the 402X career field.

Method of Analysis

General Approach

The objective of the thesis is to test the research hypothesis: A trend exists for Aircraft Maintenance Officers to receive assignments in the MAJCOM of initial duty assignment. In order to accomplish this objective it is necessary first to determine the statistical correlation between the MAJCOM of initial duty assignment and the MAJCOM of subsequent assignments, and second, to determine if that correlation indicates the hypothesized trend. As used here, assignment trend refers to the statistical

relationship between the initial duty assignment and subsequent duty assignments. Two types of assignment trend are defined:

1. Actual Assignment Trend: The actual assignment trend is that statistical correlation between the MAJCOM of initial duty assignment and the MAJCOM of subsequent duty assignments revealed by this study.
2. Binomial Assignment Trend: The binomial assignment trend describes a trend governed only by probability. The binomial assignment trend produces the statistically expected number of assignments in the MAJCOM of initial duty assignment based on the proportional size of the MAJCOM to the total of all MAJCOMs. The two choices of assignment are into the MAJCOM of interest or out of it - hence the binomial choice.

Concpetually, four findings may result from the study of assignment trends:

1. <u>No correlation is found</u>. This would automatically result in a decision to reject the research hypothesis.
2. <u>An actual assignment trend could not be found distinguishable from a binomial assignment trend</u>. This would be a positive statistical trend, but conceptually it would be no different from simply

proportionate assignments. The hypothesis would be rejected because of the second decision rule stated in "Objectives".

3. An actual assignment trend, distinguishable from a binomial assignment trend, could be found where subsequent assignments were not to the MAJCOM of initial duty assignment. This would be a negative answer to decision rule 3 and also result in a decision to reject the research hypothesis. The trend here would actually be opposite that posited.
4. An actual assignment trend, distinguishable from a binomial assignment trend, could be found where subsequent assignments were to the MAJCOM of initial duty assignment. This would be affirmative answers to decision rules 1, 2, and 3 and would result in a decision to support the research hypothesis.

Realism of the Trends

The conceptual model provides a concept for relating those officers having a career length of a particular number of assignments to their MAJCOM of initial duty assignment. The informational model organizes the elements related by the conceptual model and compares the actual assignment trend data to binomial trend data. The informational model gives assignment trends as cumulative

probability functions for spending at least r duty assignments of a career of i duty assignments in length in the MAJCOM of initial duty. Each MAJCOM's actual trend is compared to its binomial assignment trend to determine which of the four possible results previously listed apply to that MAJCOM. Should the comparison result in accepting the research hypothesis, further evaluation of the trend is performed to indicate the realism of the trend. This further evaluation is designed to put any potential statement of 4024 trend into the context of other current Air Force trends.

This further evaluation of an AMO trend will measure the trend relative to the assignment trends of two other Air Force career fields. Two fields were chosen which are universally perceived as exhibiting one of two polar assignment trends. One field has a relatively strong trend for officers to be reassigned to the MAJCOM of initial duty. The Pilot career field represents this trend in that subsequent flying assignments are strongly determined by the weapons system (i.e. MAJCOM) of the initial flying assignment. Another career field is perceived as having little relationship between the MAJCOM's of preceeding and subsequent assignments. The Civil Engineering Officer (CEO) career field somewhat represents this trend in that CEO duties do not substantially vary from MAJCOM to MAJCOM. Thus, the expected assignment trend could be expected to

approach the binomial assignment trend. Samples were taken in these two career fields in a similar manner to that done for AMOs. Again, details of this process are available in Appendix B. This Air Force trend comparison is added to the binomial comparison and the two sets comprise the informational model.

The Informational Model

Assignments in the 402X field are plotted as a cumulative probability function for specific career lengths. The function is plotted by career number of assignments rather than by a percent time ratio because, while the percent time ratio allows plotting a distribution, it masks all information concerning the actual number of assignments for an officer. The masking of this information could introduce bias into a distribution. For example: Following a period when the manpower of the career field is rapidly increased, there would be a large number of officers on second and third assignments. If a large portion of these officers remained in the MAJCOM of initial assignment, the percent assignment ratio for these officers would be high just as it would for those officers who spent a large portion of a long career in the MAJCOM of initial assignment. The result would be to bias the model to show a higher reassignment trend. Such a condition of rapidly increasing manpower currently exists as discussed under "Background".

The possibility of such a bias is overcome by plotting the distribution based on the number of assignments in a career.

In order to distinguish actual assignment probabilities, derived from the sample data, from theoretical binomial assignment probabilities, confidence intervals at the 0.10 level are constructed with a halfwidth of 1% for the actual assignment probabilities. See Appendix C. Where the confidence interval intersects a corresponding binomial assignment probability it is determined that the two probabilities were not distinguishable. This being a pilot study, the broader confidence level (instead of .05) was selected. After determining the existence of a trend, the less conservative level might be used to indicate pervasiveness of the trend.

Assignments in the Pilot career field and the CEO career field are plotted in the same manner as for AMOs. Thus, for each career length of i assignments, twenty-seven cumulative probability functions are tabulated as follows:

1. Probability function for Aircraft Maintenance Officers career field
2. Probability function for Pilot career field
3. Probability function for Civil Engineering Officer career field

4-11. Actual and Binomial function for each MAJCOM (MAC, TAC, SAC, TAC) for Aircraft Maintenance Officers

12-19. Actual and Binomial function for each MAJCOM (MAC, TAC, SAC, ATC) for pilot

20-27. Actual and Binomial function for each MAJCOM (MAC, TAC, SAC, ATC) for Civil Engineering Officers

Composite assignment trends (1-3 above) allow discussion of a particular career field in total. The composite trends for each career field are made up from the different MAJCOM trends. If one doesn't look at these specific MAJCOM trends, a lot of information is lost. Hence trends (4-27) focus more directly on the individual MAJCOMs. Each MAJCOM has a binomial probability of getting the next assignee based strictly on its population proportion. These functions naturally lead to two sets of comparisons:

1. Comparisons of the total probability functions of entire career fields (functions 1-3).
2. Comparison of actual and binomial function by career field and by MAJCOM (eg., MAC AMO's binomial versus actual).

The section on "Method of Analysis" showed how the decision rules under the "Objectives" section were operationalized. The reader will remember that there were four different outcomes of binomial trend comparison and these addressed one (or more) of three decision rules for accepting or rejecting the Research Hypotheses.

If a MAJCOM outcome passes all the requirements to support the research hypothesis under the proposed decision

rules, there still is one more hurdle to pass. If there is a positive trend but it is significantly less than for Pilots and doesn't even compare favorably with CEOs (who allegedly get cross-assignments all the time) then the problem is academically meaningful but virtually useless in context of our specific hierarchy of hypotheses. The operating assumption would then have to be that all assignments in the military cause some significant degree of MAJCOM isolation, and AMO's are simply one unfortunate group of many. While this could be a relevant finding, note that it carries seeds of a totally different solution (addressing total assignment practices), and therefore, we must know if this alternative is supported.

After comparison of the actual assignment trends with the statistically derived binomial trend lines, the cumulative probability distribution for the AMO career field resulting from the assignment data is compared to the two other trends established for the Pilot and CEO fields. In the comparisons, five outcomes are possible:

1. <u>The confidence interval for the AMO assignment trend intersects the confidence interval for one of the standards</u>. When the intersection is with the Pilot standard, it supports the inference that the trend displayed by the actual AMO assignment data is high (both absolutely and relatively). When the intersection occurs with the CEO standard,

it supports the inferrence that the trend displayed by the actual AMO assignment data is not strong.

2. The confidence interval for the AMO assignment trend does not intersect the confidence interval for either standard but lies wholly above the cumulative probability function for the Pilot standard. When this occurs it is inferred that the trend displayed by the actual AMO assignment data is high.
3. The confidence interval for the AMO assignment trend intersects the confidence intervals for both standards. When this occurs, inferences as to the strength of the trend to support a perception are indeterminate.
4. The confidence interval for the AMO assignment trend intersects neither standard's confidence interval, and the actual AMO cumulative distribution function lies between the standards. When this occurs, inferences as to the strength of the trend to support a perception of a trend are indeterminate.
5. The confidence intervals for the two standards themselves intersect. When this occurs, there is no significant differences between assignment trends perceived as being MAJCOM oriented and assignment trends perceived as being non-MAJCOM oriented. Conclusions of trend must then be wholly

dependent on evaluation of the 402X trend line with the binomial trend line.

As the reader might perceive, the above five outcomes not only serve as a confidence check on a trend potentially meeting the research hypothesis, but they also provide a wealth of comparative information on all trends. If a MAJCOM or aggregate trend line statistically supports the research hypothesis but fails the above operational tests, the degree and type of failure will be evaluated before a final conclusion is made. A very minor overlap with the CEO function, for instance, might lead to a conclusion that a positive but weak trend for reassignment to a MAJCOM does exist.

CHAPTER III

ANALYSIS

General Approach

Before a record of officer assignment history could be included in the sample, the numbers and types of assignments held by that officer had to meet established decision criteria that identified the officer as being in the population. That criteria was established earlier. The expanded criteria seen in this section were derived only after an attempt was made to actually analyze data - hence inclusion here. When a record satisfied the decision criteria it was assigned a case number and a data card. On the data card the assignment history was coded by MAJCOM of each assignment in the career field, total number of assignments in the career field, and total number of assignments in the MAJCOM of initial duty assignment.

Data Received from AFMPC

AFMPC supplied the data in the form of officer personnel briefs (6,7,8). An initial test set of data for the 40XX career fields was drawn. The test set, composed of 10% (by last digit of SSAN) of the officers in the grades 2nd lieutenant through major, served as an initial test of

the adequacy of the decision criteria and of the informational model. As a result of the initial test, a final data set composed of 80% of officers in the grades 2nd lieutenant through major currently holding AFSC 402X or 401X was drawn. AFMPC also supplied data sets of 80% of all CEOs, 2nd lieutenant through major; and for Pilots, 10% of all 2nd lieutenants through major.

Analysis of Aircraft Maintenance Officers Records

The analysis of the initial 10% data set of 40XX assignment records indicated that the established decision criteria were inadequate to determine if an officer's record should be included in the population of career aircraft maintenance officers. A discussion of additional decision criteria established to test for inclusion in the population follows:

1. Prior to 1974 numerous duty assignments were identified on assignment records as Aircraft Maintenance Officers yet assigned AFSCs other than 402X. Also, numerous AFSCs existed for duties included under the description of the aircraft maintenance career field as listed in AFR36-1 (9). It was discovered that between the period from 1972 through 1974 numerous career fields dealing with the maintenance of aircraft and aircraft subsystems were combined

under the current AFSC, 402X (7). The following AFSCs were included:

a) 323X-Avionics Maintenance

b) 404X-Avionics Maintenance, SRAM officers

c) 403X-Maintenance Supervisor

d) 434X-Aircraft Maintenance Officer

These numerous career specialties were combined under a common AFSC because of the similarities between them. For example, a 402X now assigned to avionics maintenance performs essentially the same duties as the old 323X officer. Thus the following new decision criteria was established: Any duty assignment during which an officer held an AFSC of 323X, 404X, 403X, or 434X shall be considered an assignment in the 402X career field.

2. Numerous instances were discovered where officers below the grade of major were either currently holding, or previously held, a duty AFSC of 401X. In an officer career progression the XX11 AFSC indicates the entry level to a staff officer assignment; the XX16 AFSC indicates the fully qualified staff officer level. The XX11 AFSC normally is awarded to the officer upon promotion to major. The holding of a 4011 AFSC by a company grade AMO thus indicates that the officer is assigned to a position that would normally be assigned to a

higher grade officer. Such an assignment for a company grade AMO would indicate an officer has experience in the aircraft maintenance field and the potential, as perceived by superiors, to perform adequately at the higher level. The assignment at the 401X level would provide the AMO a depth of experience and broad perception of the maintenance function to carry back to a reassignment at the 4024 assignment level. Thus, since a company grade assignment to the 401X level directly enhances the development and experience of the AMO, the following new decision criteria was established: Any duty assignment during which the AFSC 4011 was held below the grade of major shall be considered as an assignment to the 4024 career field.

3. Establishing the preceeding decision criteria necessitated a change in the population description to include officers currently holding the 401X AFSC. The majority of officers holding the 4011 AFSC were recently promoted majors, since upgrading the 4011 AFSC to 4016 generally occurs within 18 months of promotion to major (11). Therefore, the assignment histories through the 402X career field of those recently promoted majors would still apply to any current assignment trends in the career field. Inclusion of the 401X AFSC into the

population was conditional upon the officer having spent a career as an AMO as opposed to entering a career broadening or rated supplement assignment at the 401X level. Also, Munitions Maintenance Officers, AFSC 405X, share the 401X staff level AFSC with AMOs. Thus, the following new decision criteria was established: The sample of the population shall include the 402X assignment histories of all majors holding the 4011 AFSC.

4. In 1979 the Air Defense Command (ADC) was abolished and its mission absorbed by TAC. The resulting realignment of personnel resulted in the establishment of the following new decision criteria: All AMO assignments to ADC shall be considered as assignments to TAC.

5. While the MAJCOMs MAC, TAC, SAC, ATC and the over seas commands such as the Pacific Air Force, and Air Force Europe account for the bulk of AMO utilization, certain other MAJCOMs such as the Air Force Logistics Command (AFLC) and the Air Force Systems Command (AFSC) receive AMOs on the initial duty assignment. While the number of officers going to these other commands did not appear to be large, the following new decision criteria was established to account for them: All duty assignments to the 402X career field in MAJCOM's other than MAC, TAC,

SAC, ATC, or a command that can be converted to one of these, shall be considered an assignment to MAJCOM "other".

The purpose for establishing the original and the new decision criteria was to define a population of officers whose past Air Force careers have been primarily devoted to the maintenance of aircraft and whose future careers in the Air Force will probably continue to deal with the complex task of maintaining modern Air Force aircraft. A clear definition of this population is essential to the informational model derived to test the research hypothesis of existance of an assignment trend for AMOs. While many AMO positions may be filled with officers on a career broadening assignment, and numerous maintenance staff officer positions filled with field grade officers on a rated supplement assignment, the successful accomplishment of aircraft maintenance would seem to depend on officers who have devoted their careers to gaining knowledge and experience in the field. The hierarchy of abstraction posed in the "Delimitation" of this thesis reflects concern over the career potential of these officers. Therefore, the essence of the decision criteria is to identify the "career" AMO. The decision criteria used to define that population are summarized below.

1. Any duty assignment during which an officer held an AFSC of 323X, 404X, 403X, or 434X shall be

considered an assignment to the 402X career field.

2. Any duty assignment during which an officer held an AFSC of 4011 below the grade of major shall be considered an assignment to the 4024 career field.
3. The sample of the population shall include the 402X assignment histories of majors currently holding a 4011 AFSC.
4. All AMO assignments to ADC shall be considered as assignments to TAC.
5. All AMO assignments to tactical airlift aircraft in TAC (such as C-130) shall be considered as assignment to MAC.
6. All duty assignments to a unified command or over seas command shall be considered an assignment to the MAJCOM (MAC, TAC, SAC) having functional control of the aircraft unit to which the AMO is assigned.
7. All duty assignments to the 402X career field in MAJCOMs other than MAC, TAC, SAC, ATC, or a command that can be converted to one of these shall be considered an assignment to MAJCOM "other".
8. Career broadening assignments out of the 402X career field shall not be included in the assignment history of an AMO.

Analysis of Pilot Records

As previously stated, the purpose of including Pilot assignment trends in a study of AMO assignment trends is to serve as a universally accepted standard of comparison. A philosophy of conservatism guided the analysis of Pilot assignment histories.

As used here, a conservative decision regarding Pilot assignment trends is one that would result in a higher probability of reassignment to the MAJCOM of initial duty assignment, or a narrower confidence band for the assignment trend found.

The Pilot career fields are identified by numerous AFSCs; however, all pilot records are centrally maintained at AFMPC (8) regardless of the AFSC of the current duty assignment (flying or non flying AFSC). The data set from which the Pilot population sample was obtained was randomly drawn in the same manner as the AMO data set. The following decision criteria were established to define the population of Pilots and to draw the sample from which the Pilot assignment trend was derived:

1. The career progression of the pilot force is closely monitored by AFMPC so that pilots may gain leadership, planning, and management skills as well as technical expertise in assigned weapons systems. To this end pilots periodically receive assignments

to various career fields other than flying. Such rated supplement assignments may or may not be in the MAJCOM of the officers' initial or previous flying assignment. Since the Pilot assignment trend is to reflect the universally perceived notion that Pilot assignments are dependent upon the MAJCOM of initial assignment, inclusion of non flying assignments in the trend would only serve to weaken that perception, resulting in a less conservative standard against which to compare the AMO assignment trend. Therefore the following decision criteria was established: Only assignments in which the primary function of the Pilot was the performance of flying duties, as opposed to rated supplement assignments, academic instructor duties, planning officer duties, etc. shall be included in an assignment history.

2. To insure that the flying assignments included in the assignment histories were of an operational or mission nature the following decision criteria was established: No assignment as a student or trainee pilot shall be included in an assignment history.
3. As discussed under the AMO decision criteria, the absorbtion of the ADC mission by TAC and the transfer of the tactical airlift mission from TAC to MAC resulted in the following two decision criteria:

Assignments to tactical airlift aircraft in TAC shall be considered as assignments to MAC. Assignments to ADC shall be considered assignments to TAC.

4. In order to trace the assignment trend through assignments to unified commands or overseas commands, the weapons system to which the Pilot was assigned was identified and the following decision criteria was applied: Assignments to unified and overseas commands shall be considered as assignments to the MAJCOM (MAC, TAC, SAC) having functional responsibility for the weapons system to which the Pilot is assigned.

It must be emphasized that the development of an assignment trend for Pilots is to serve as a standard against which the assignment trend for AMOs can be compared. The philosophy was to develop decision criteria and apply them to Pilot assignment histories in order to exercise the research hypothesis. No attempt should be made to infer conclusions or develop insights into the assignment practices for Air Force Pilots. A summary of the Pilot decision criteria follows:

1. Only assignments in which the primary function of the pilot was the performance of flying duties shall be included in an assignment history.
2. No assignments as a student or trainee pilot shall be included in an assignment history.

3. Assignments to ADC shall be considered as assignments to TAC.
4. Assignments to tactical airlift aircraft in TAC shall be considered as assignments to MAC.
5. Assignments to unified and overseas commands shall be considered as assignments to the MAJCOM (MAC, TAC, SAC) having functional responsibility for the weapons system to which the Pilot is assigned.

Analysis of Civil Engineer Officer Records

Including CEO assignment trends in the study of AMOs served the same purpose as including Pilot assignment trends. That is, the CEO assignment trends served as a universally accepted standard against which the AMO assignment trends were compared. Assignment histories were also analyzed based on the philosophy of conservatism so that a nearer to random distribution of assignments to the MAJCOMs resulted.

The data set from which the CEO sample was obtained was randomly drawn from the personnel field records maintained at AFMPC by Palace Blue Print following the same procedures used for AMOs. The following decision criteria were established to define the population of the CEOs and draw the sample from which the CEO assignment trends were derived:

1. An assignment to the CEO career field shall be defined as an assignment where the 552X AFSC was held and duty was performed for a civil engineering organization.
2. No assignment as a student shall be included in an assignment history.
3. CEO duties, unlike Pilots' or AMOs', bear no relationship to particular weapons systems; therefore, relating overseas or unified command assignments to MAC, TAC, SAC, or ATC is not necessary. Thus no decision criteria designed to relate unified command and overseas assignments to MAC, TAC, SAC, or ATC was included.
4. Initial duty assignments to the 552X career field in commands other than MAC, TAC, SAC, or ATC shall be considered as assignments to "other".
5. Any duty assignment during which an officer held an AFSC of 551X below the grade of major shall be considered an assignment to the 5525 career field.
6. The sample of the population shall include the 552X assignment histories of majors currently holding a 5511 AFSC.

As with the Pilot career field, the CEO career field was intended to serve as a standard for comparison for AMO assignment trends; thus, decision criteria for CEOs were designed to exercise the research hypothesis. There

was no intent to infer conclusions or develop insight into the assignment practices for CEOs.

Application of various decision rules are demonstrated and explained in Appendix D.

CHAPTER IV

RESULTS

The results of the data analysis are tabulated in Tables 1 through 14 and plotted in Figures 3 through 54.

Summary of the Data Sets

Table 1 is a summary of the data sets for the Aircraft Maintenance Officer, Civil Engineering Officer, and Pilot career fields as they were sorted to determine the sample population. The two columns under each of the career field headings denote the number of cases obtained in each data set vs. the number of cases estimated to be required for an accuracy of ± 0.01 at the 0.10 confidence level (± 0.02 for Pilot career field). As used here, one case represents one officer personnel record. The first row of the table under the heading ACTUAL lists the number of cases from each data set that met all of that career field's decision criteria and, therefore, were included in that career field's sample population. The second and third rows under ACTUAL list the number of cases that were rejected from the population. Row two specifically identifies the number of cases where the officer is currently on the initial duty assignment in the career field. Notice

that for the AMO career field, officers on their initial duty assignment comprise approximately 43% of the data set. It appears that this large percentage of initial duty officers may reflect the current Air Force policy to rapidly increase AMO manning levels by an influx of new personnel, as discussed in the "Introduction" of this thesis. The large percentage of initial duty officers encountered in the data set also confirms the decision to compute assignment trends by number of assignments in a career rather than by a percent time ratio as discussed in the "Methodology" portion of this thesis. The third row under ACTUAL lists the number of cases rejected for failing to meet other decision criteria for the career field. The fourth row under ACTUAL lists the sum of rows 1, 2, and 3. The fourth row under ESTIMATE lists the estimated sample size required to obtain the desired accuracy as calculated in Appendix C.

Table 1 indicates that the assumptions used to estimate the required size of data sets produced adequate data sets for all but the CEO career field. It was anticipated that the method of estimating data set sizes would produce the desired set size in all instances.

Table 2, discussed below, indicates that the assumed assignment history distribution was accurate for the CEO career field; therefore the short fall in the CEO data set size demands investigation.

A review of the population size and estimate calculations indicates that a possible reason for the short fall may be that a 70% rather than 80% data set was drawn. A 70% data set would number approximately 1015. As discussed under "Calculation of Minimum Sample Size", the effect of a small sample on the study would be to reduce its accuracy. As can be seen from Table 2, the desired accuracy at the career field level of ±1% was attained in spite of the short fall. Correction of the short fall would require destroying the current data set and obtaining another 80% sample from AFMPC. In view of the cost to AFMPC for each data set and because the desired accuracy was attained in spite of the short fall, the authors elected not to obtain a new 80% sample.

Table 2 indicates the validity of the assumed relationship between an officer's grade and the number of assignments in his career. This assumption aided in deriving an estimate of the required size of each data set. The table compares the estimated distribution of career length (by number of assignments), based on the assumed foregoing relationship, to the actual distribution of career lengths derived from the data sets. The first row of each career field lists the portion of the population estimated to have each career length. The second row of each career field lists the actual portion derived from the sample population. The third row of each career field lists the corresponding

TABLE 1

SUMMARY OF DATA SETS AS SORTED

FOR SAMPLE POPULATION

	AMO		PILOT		CE	
	ACTUAL	ESTIMATE	ACTUAL	ESTIMATE	ACTUAL	ESTIMATE
Sample Population	865	----	1200	----	659	----
One Assign. Career	717	----	422	----	259	----
Reject	79	----	230	----	59	----
Total	1661	1124	1852	1691	977	1113

TABLE 2

DEMOGRAPHY OF CAREER LENGTHS BY

NUMBER OF ASSIGNMENTS

		1	2	3	4	5	6	7
	EST	.40	.27	.14	.15	.02	.02	---
AMO	SAMP	.45	.22	.18	.11	.03	.01	$.00^{+}$
	CI	$\pm.01$	$\pm.01$	$\pm.01$	$\pm.01$	$\pm.00$	$\pm.00$	---
	EST	.30	.23	.13	.20	.07	.07	---
CE	SAMP	.28	.26	.19	.15	.09	.03	$.00^{+}$
	CI	$\pm.01$	$\pm.01$	$\pm.01$	$\pm.01$	$\pm.01$	$\pm.00$	---
	EST	---	---	---	---	---	---	---
PILOT	SAMP	.26	.35	.23	.11	.04	.01	$.00^{+}$
	CI	$\pm.02$	$\pm.01$	$\pm.02$	$\pm.01$	$\pm.01$	$\pm.00$	---

accuracy at the 0.10 confidence level of the sample distribution. As can be seen, the desired accuracy was achieved for all career fields.

Table 3 is a summary of the data sets for the Aircraft Maintenance Officer, Civil Engineering Officer, and Pilot career fields as they were sorted to determine an estimate of the current population proportion of each MAJCOM for the career field. This population proportion served as the basis for calculating the MAJCOMs' random binomial assignment trend for each career field. The rows under the columns headed SAC, MAC, TAC, ATC, and OTHER relate to the following: The first row for each career field lists the number of cases where the officers are currently on the initial duty assignment in the career field. The horizontal sum of row one for each career field equals the corresponding ONE ASSIGNMENT CAREER figure in row two of Table 1. The second row for each career field lists the number of cases where the officer has had two or more assignments in the career field and the current assignment is in the MAJCOM heading the column. The third row for each career field lists the sum of rows one and two. The fourth row for each career field lists the current population proportion for the MAJCOM. The population proportion was obtained from the ratio of the total for a MAJCOM to the sum of the totals across all MAJCOMs for the career field. Finally, the fifth row for each career field lists the corresponding

TABLE 3

SUMMARY OF DATA SETS AS SORTED FOR

CURRENT MAJCOM POPULATION PROPORTIONS

		MAJCOM						
		SAC	MAC	TAC	ATC	OTHER	MAJORS	REJECTS
	One Assign	163	147	310	63	34	---	69
	Two or more Assign	121	116	362	97	82	66	31
AMO	Total	284	263	672	160	116	66	100
	$\bar{p}$	0.19	0.18	0.45	0.11	.07	---	---
	C.I.	$\pm$.01	$\pm$.01	$\pm$.01	$\pm$.01	$\pm$.00	---	---
	One Assign	84	20	48	40	67	---	---
	Two or more Assign	48	28	56	28	325	210	---
CE	Total	132	48	104	68	392	210	23
	$\bar{p}$	0.18	0.06	0.14	0.09	0.53	---	---
	C.I.	$\pm$.01	$\pm$.01	$\pm$.01	$\pm$.01	$\pm$.01	---	---
	One Assign	132	124	93	73	---	---	---
	Two or more Assign	124	189	212	62	---	---	---
PILOT	Total	256	313	305	135	---	---	843
	$\bar{p}$	0.26	0.31	0.30	0.13	---	---	---
	C.I.	$\pm$.02	$\pm$.02	$\pm$.02	$\pm$.02	---	---	---

accuracy at the 0.10 confidence level for each population proportion. The columns headed MAJORS and REJECTS of Table 3 list, respectively, the number of cases comprised of majors holding a XXIX AFSC (see AMO decision criteria 3 and CEO decision criteria 5), and the number of cases rejected for failing to meet other decision criteria. Notice that the large number of Pilots rejected consisted primarily of those pilots currently holding a non-flying duty assignment (see Pilot decision criteria 1).

Summary of Career Histories

Tables 4 through 9 are detailed accountings of the career histories of those cases meeting all decision criteria for inclusion into the sample population of each career field as summarized in row one of Table 1. Each career field consists of two tables: Tables 4 and 5 - AMO, Tables 6 and 7 - Pilot, and Tables 8 and 9 - CEO. Each career field is accounted for in total and by each MAJCOM. The columns denote career length by number of assignments. The rows list the cumulative number of cases having had <u>at least</u> each given number of these career assignments in the MAJCOM of initial duty. The side headings of MAC, TAC, SAC, ATC, and OTHER denote these as the MAJCOM of initial duty. The figure in the column headed TOTAL, under the side heading TOTAL of Tables 4, 6, and 8 correspond to row one of Table 1. Tables 4 through 9 are used to calculate

TABLE 4

CUMULATIVE DISTRIBUTION OF ASSIGNMENT HISTORIES FOR AIRCRAFT MAINTENANCE: TOTALS, MAC, AND TAC

	at least	CAREER ASSIGNMENTS						
		2	3	4	5	6	7	TOTAL
TOTALS	1	325	285	172	42	9	2	865
	2	229	207	141	37	5	2	
	3		103	108	32	5	2	
	4			57	26	5	1	
	5				12	3	1	
	6					1	1	
	7						0	
MAC	1	81	48	28	7	3	0	167
	2	53	35	23	6	1	0	
	3		16	17	5	1	0	
	4			10	5	1	0	
	5				3	1	0	
	6					1	0	
	7						0	
TAC	1	148	103	65	16	1	2	335
	2	112	94	61	14	1	2	
	3		57	56	13	1	2	
	4			25	10	1	1	
	5				7	1	1	
	6					0	1	
	7						0	

TABLE 5

CUMULATIVE DISTRIBUTION OF ASSIGNMENT HISTORIES FOR AIRCRAFT MAINTENANCE, SAC, ATC, AND OTHERS

	at least	CAREER ASSIGNMENTS						
	A	2	3	4	5	6	7	TOTAL
	1	78	85	53	17	1	0	234
	2	50	61	38	16	1	0	
SAC	3		26	28	14	1	0	
	4			19	11	1	0	
	5				2	1	0	
	6					1	0	
	7						0	
	1	36	35	16	1	4	0	92
	2	10	10	10	1	2	0	
ATC	3		4	3	0	2	0	
	4			3	0	2	0	
	5				0	0	0	
	6					0	0	
	7						0	
	1	12	14	10	1	0	0	37
	2	4	7	9	0	0	0	
OTHERS	3		0	4	0	0	0	
	4			0	0	0	0	
	5				0	0	0	
	6					0	0	
	7						0	

TABLE 6

CUMULATIVE DISTRIBUTION OF ASSIGNMENT HISTORIES

FOR PILOTS: TOTALS, MAC, AND TAC

	at least A	CAREER ASSIGNMENTS 2	3	4	5	6	7	TOTAL
TOTALS	1	557	380	179	71	11	2	1200
	2	343	275	148	62	10	2	
	3		187	120	59	9	1	
	4			89	55	8	1	
	5				41	8	1	
	6					6	1	
	7						0	
MAC	1	130	126	56	15	1	0	328
	2	95	105	46	14	1	0	
	3		77	38	14	0	0	
	4			26	12	0	0	
	5				9	0	0	
	6					0	0	
	7						0	
TAC	1	166	137	77	37	7	1	425
	2	128	106	72	36	7	1	
	3		84	65	36	7	1	
	4			57	35	7	1	
	5				29	7	1	
	6					6	1	
	7						1	

TABLE 7

CUMULATIVE DISTRIBUTION OF ASSIGNMENT HISTORIES FOR PILOTS: SAC AND TAC

	at least A	CAREER ASSIGNMENTS 2	3	4	5	6	7	TOTAL
SAC	1	133	58	30	15	3	1	240
	2	88	40	23	10	2	1	
	3		25	15	9	1	1	
	4			6	8	1	1	
	5				3	1	1	
	6					0	1	
	7						1	
ATC	1	128	59	16	4	0	0	207
	2	32	24	7	2	0	0	
	3		1	2	0	0	0	
	4			0	0	0	0	
	5				0	0	0	
	6					0	0	
	7						0	

TABLE 8

CUMULATIVE DISTRIBUTION OF ASSIGNMENT HISTORIES

FOR CIVIL ENGINEERS: TOTALS, MAC, AND TAC

	at least	CAREER ASSIGNMENTS						
	A	2	3	4	5	6	7	TOTAL
TOTALS	1	236	171	138	83	27	4	659
	2	23	37	37	30	7	3	
	3		4	3	5	1	0	
	4			1	0	0	0	
	5				0	0	0	
	6					0	0	
	7						0	
MAC	1	11	11	6	5	3	1	37
	2	1	3	2	3	0	1	
	3		0	1	0	0	0	
	4			0	0	0	0	
	5				0	0	0	
	6					0	0	
	7						0	
TAC	1	44	38	43	22	4	1	152
	2	4	6	9	9	1	1	
	3		2	0	2	0	0	
	4			0	0	0	0	
	5				0	0	0	
	6					0	0	
	7						0	

TABLE 9

CUMULATIVE DISTRIBUTION OF ASSIGNMENT HISTORIES

FOR CIVIL ENGINEERS: SAC, ATC, AND OTHERS

	at least A	CAREER ASSIGNMENTS 2	3	4	5	6	7	TOTAL
	1	78	38	33	19	6	0	174
	2	10	7	14	8	1	0	
SAC	3		1	2	0	0	0	
	4			0	0	0	0	
	5				0	0	0	
	6					0	0	
	7						0	
	1	33	22	10	6	3	0	74
	2	4	7	0	1	1	0	
ATC	3		0	0	1	0	0	
	4			0	0	0	0	
	5				0	0	0	
	6					0	0	
	7						0	
	1	70	62	46	31	11	2	222
	2	4	14	14	12	1	1	
OTHERS	3		1	1	4	0	0	
	4			1	0	0	0	
	5				0	0	0	
	6					0	0	
	7						0	

the actual assignment trends for each career field and each MAJCOM within that career field according to the plan described in Appendix B.

Summary of Actual and Binomial Trends

Tables 10 through 13 compare the cumulative random binomial trend probabilities and corresponding actual trend probabilities of spending at least r assignments out of a career of i assignments in the MAJCOM of initial duty where the MAJCOM of initial duty heads each table. The columns of random binomial probabilities are headed P(B), and the columns of actual probabilities are headed P(A). An entry of 0 indicates that no case fell within that category. It may be seen in each table, since the probabilities are cumulative, that as the number of assignments in the initial MAJCOM increases the probability of that assignment history decreases. Also, that as both the number of assignments in a career and the number of assignments in the initial MAJCOM increase, the confidence interval about the probability increases. In some instances the confidence interval appears to exceed the probability. This is a result of the method of taking the data sets. As was previously discussed in the Sampling Plan, personnel records could not be extracted from the computer files based on the number of assignments in a career. Therefore, a relationship between grade and assignment length was assumed, and the size of each data

TABLE 10

ACTUAL AND BINOMIAL TREND

PROBABILITIES FOR MAC

	AMO		CEO		PILOT	
r of i	P(B)	P(A)	P(B)	P(A)	P(B)	P(A)
1 - 2	1.00	1.00	1.00	1.00	1.00	1.00
2 - 2	0.18	.65±.06	0.06	.09±.07	0.31	.73±.11
1 - 3	1.00	1.00	1.00	1.00	1.00	1.00
2 - 3	0.33	.73±.09	0.11	.27±.12	0.52	.83±.12
3 - 3	0.03	.33±.06	.00	0	0.10	.61±.11
1 - 4	1.00	1.00	1.00	1.00	1.00	1.00
2 - 4	0.45	.82±.12	0.17	.33±.17	0.67	.82±.19
3 - 4	0.09	.60±.11	0.01	.17±.12	0.23	.68±.17
4 - 4	0.01	.36±.08	0	0	0.03	.46±.14
1 - 5	1.00	1.00	1.00	1.00	1.00	1.00
2 - 5	0.55	.86±.26	0.22	.60±.25	0.77	.93±.39
3 - 5	0.15	.71±.23	0.02	0	0.36	.93±.39
4 - 5	0.02	.71±.23	.00	0	0.09	.80±.36
5 - 5	0	.43±.18	.00	0	0.01	.60±.31
1 - 6	1.00	1.00	1.00	0	1.00	1.00
2 - 6	0.63	.33±.25	0.27	1.00	0.84	1±1.56
3 - 6	0.22	.33±.25	0.04	0	0.49	1±1.56
4 - 6	0.04	.33±.25	0.01	0	0.17	0
5 - 6	.00	.33±.25	.00	0	0.03	0
6 - 6	.00	.33±.25	.00	0	.00	0
1 - 7	1.00	1.00	1.00	1.00	--	0
2 - 7	0.70	0	0.31	1.00-.74	--	0
3 - 7	0.30	0	0.05	0	--	0
4 - 7	0.08	0	0.01	0	--	0
5 - 7	0.02	0	.00	0	--	0
6 - 7	.00	0	.00	0	--	0
7 - 7	.00	0	.00	0	--	0

TABLE 11

ACTUAL AND BINOMIAL TREND

PROBABILITIES FOR TAC

	AMO		CEO		PILOT	
r of i	P(B)	P(A)	P(B)	P(A)	P(B)	P(A)
1 - 2	1.00	1.00	1.00	1.00	1.00	1.00
2 - 2	0.45	.76±.05	0.14	.09±.03	0.30	.77±.10
1 - 3	1.00	1.00	1.00	1.00	1.00	1.00
2 - 3	0.70	.91±.07	0.26	.16±.05	0.51	.77±.11
3 - 3	0.20	.55±.05	0.02	.05±.03	0.09	.61±.10
1 - 4	1.00	1.00	1.00	1.00	1.00	1.00
2 - 4	0.83	.94±.09	0.36	.21±.05	0.66	.94±.17
3 - 4	0.42	.86±.08	0.05	0	0.22	.84±.16
4 - 4	0.09	.38±.06	0.00	0	0.03	.79±.15
1 - 5	1.00	1.00	1.00	1.00	1.00	1.00
2 - 5	0.91	.88±.17	0.45	.41±.10	0.76	.97±.25
3 - 5	0.61	.81±.16	0.09	.09±.05	0.35	.97±.25
4 - 5	0.24	.63±.14	.00	0	0.09	.94±.25
5 - 5	0.04	.44±.12	.00	0	0.01	.78±.22
1 - 6	1.00	1.00	1.00	1.00	1.00	1.00
2 - 6	0.95	1.00±.74	0.53	.25±.18	0.83	1.00±.59
3 - 6	0.73	1.00±.74	0.15	0	0.47	1.00±.59
4 - 6	0.39	1.00±.74	0.03	0	0.16	1.00±.59
5 - 6	0.12	1.00±.74	0.01	0	0.03	1.00±.59
6 - 6	0.01	0	.00	0	.00	.86±.54
1 - 7	1.00	1.00	1.00	1.00	--	1.00±1.56
2 - 7	0.97	1.00±.52	0.60	1.00-.74	--	1.00±1.50
3 - 7	0.83	1.00±.52	0.20	0	--	1.00±1.56
4 - 7	0.55	1.00±.52	0.04	0	--	1.00±1.56
5 - 7	0.25	1.00±.52	0.01	0	--	1.00±1.56
6 - 7	0.06	.50±.37	0	0	--	1.00±1.56
7 - 7	.00	.50±.37	0	0	--	1.00±1.56

TABLE 12

ACTUAL AND BINOMIAL TREND

PROBABILITIES FOR SAC

	AMO		CEO		PILOT	
r of i	P(B)	P(A)	P(B)	P(A)	P(B)	P(A)
1 - 2	1.00	1.00	1.00	1.00	1.00	1.00
2 - 2	0.19	.64±.06	0.18	.13±.03	0.24	.66±.11
1 - 3	1.00	1.00	1.00	1.00	1.00	1.00
2 - 3	0.34	.72±.07	0.33	.18±.05	0.45	.69±.17
3 - 3	0.03	.31±.04	0.03	.03±.02	0.07	.43±.13
1 - 4	1.00	1.00	1.00	1.00	1.00	1.00
2 - 4	0.47	.72±.08	0.45	.42±.08	0.59	.77±.25
3 - 4	0.10	.53±.07	0.09	.06±.03	0.16	.50±.20
4 - 4	0.01	.36±.06	0.01	0	0.01	.20±.13
1 - 5	1.00	1.00	1.00	1.00	1.00	1.00
2 - 5	0.57	.94±.17	0.55	.42±.11	0.70	.67±.33
3 - 5	0.17	.82±.16	0.15	0	0.28	.60±.31
4 - 5	0.03	.65±.14	0.02	0	0.06	.53±.29
5 - 5	0.01	.12±.06	.00	0	.00	.20±.18
1 - 6	--	1.00	--	1.00	--	1.00
2 - 6	--	1.00±.74	--	.17±.12	--	.67±.74
3 - 6	--	1.00±.74	--	0	--	.33±.52
4 - 6	--	1.00±.74	--	0	--	.33±.52
5 - 6	--	1.00±.74	--	0	--	.33±.52
6 - 6	--	1.00±.74	--	0	--	0
1 - 7	--	0	--	0	--	1.00
2 - 7	--	0	--	0	--	.50±.78
3 - 7	--	0	--	0	--	.50±.78
4 - 7	--	0	--	0	--	.50±.78
5 - 7	--	0	--	0	--	.50±.78
6 - 7	--	0	--	0	--	.50±.78
7 - 7	--	0	--	0	--	.50±.78

TABLE 13

ACTUAL AND BINOMIAL TREND

PROBABILITIES FOR ATC

	AMO		CEO		PILOT	
r of i	P(B)	P(A)	P(B)	P(A)	P(B)	P(A)
1 - 2	1.00	1.00	1.00	1.00	1.00	1.00
2 - 2	0.11	.28±.06	0.09	.12±.04	0.13	.25±.07
1 - 3	1.00	1.00	1.00	1.00	1.00	1.00
2 - 3	0.21	.29±.07	0.17	.32±.09	0.24	.41±.13
3 - 3	0.01	.11±.04	0.01	0	0.02	.02±.03
1 - 4	1.00	1.00	1.00	1.00	1.00	1.00±.26
2 - 4	0.30	.63±.14	0.25	0	0.34	.44±.26
3 - 4	0.04	.18±.08	0.03	0	0.04	.13±.14
4 - 4	0.01	.18±.08	0.01	0	.00	0
1 - 5	1.00	1.00	1.00	1.00	1.00	1.00
2 - 5	0.37	1.00±.74	0.31	.17±.12	0.43	.50±.55
3 - 5	0.06	0	0.09	.17±.12	0.09	0
4 - 5	.00	0	.00	0	0.01	0
5 - 5	.00	0	.00	0	.00	0
1 - 6	--	1.00	--	1.00	--	0
2 - 6	--	.50±.26	--	.33±.25	--	0
3 - 6	--	.50±.26	--	0	--	0
4 - 6	--	.50±.26	--	0	--	0
5 - 6	--	0	--	0	--	0
6 - 6	--	0	--	0	--	0
1 - 7	--	0	--	0	--	0
2 - 7	--	0	--	0	--	0
3 - 7	--	0	--	0	--	0
4 - 7	--	0	--	0	--	0
5 - 7	--	0	--	0	--	0
6 - 7	--	0	--	0	--	0
7 - 7	--	0	--	0	--	0

TABLE 14

ACTUAL TRENDS FOR TOTAL

CAREER FIELDS

r of i	AMO P(A)	CEO P(A)	PILOT P(A)
1 - 2	1.00	1.00	1.00
2 - 2	.65±.03	.10±.01	.62±.04
1 - 3	1.00	1.00	1.00
2 - 3	.73±.03	.22±.03	.72±.06
3 - 3	.36±.02	.02±.01	.49±.05
1 - 4	1.00	1.00	1.00
2 - 4	.87±.05	.27±.03	.83±.10
3 - 4	.67±.04	.02±.01	.67±.09
4 - 4	.35±.03	.01±.01	.50±.08
1 - 5	1.00	1.00	1.00
2 - 5	.88±.10	.36±.05	.87±.17
3 - 5	.76±.10	.06±.02	.83±.16
4 - 5	.62±.09	0	.77±.16
5 - 5	.29±.06	0	.58±.14
1 - 6	1.00	1.00	1.00
2 - 6	.56±.18	.26±.07	.91±.45
3 - 6	.56±.18	.04±.03	.82±.42
4 - 6	.56±.18	0	.73±.40
5 - 6	.33±.14	0	.73±.40
6 - 6	.11±.08	0	.55±.35
1 - 7	1.00	1.00	1.00
2 - 7	1.00±.52	.75±.32	1.00±1.03
3 - 7	1.00±.52	0	.50±.78
4 - 7	.50±.37	0	.50±.78
5 - 7	.50±.37	0	.50±.78
6 - 7	.50±.37	0	.50±.78
7 - 7	0	0	0

set was based on that assumption. The results and accuracy of that assumption are summarized in Table 2. However, in order to perform a by-MAJCOM comparison of actual to random binomial assignment trends it was necessary to make the probabilities conditional upon being in a particular MAJCOM on the first duty assignment. See Appendix C. This condition reduced the number of officers in certain categories so low as to render a two sided confidence interval at the 0.10 level meaningless. Since this situation generally occurred only for six and seven assignment careers, rather than decrease the confidence, to say the 0.20 level, the six and seven assignment careers were excluded from further consideration.

Table 14 is constructed similarly to Tables 10 through 13; however, Table 14 compares the actual assignment trends of the AMO career field to those of the two standards, the CEO and Pilot career fields. Six and seven assignment careers from Table 14 shall also receive no further consideration.

Graphs of AMO Actual and Binomial Trends

Figures 3 through 18 are the graphical comparison of the random binomial and actual assignment trends for the AMO career field for 2, 3, 4, and 5 assignment careers as listed in Tables 10 through 13. Notice that in all but two instances the actual assignment probabilities are clearly

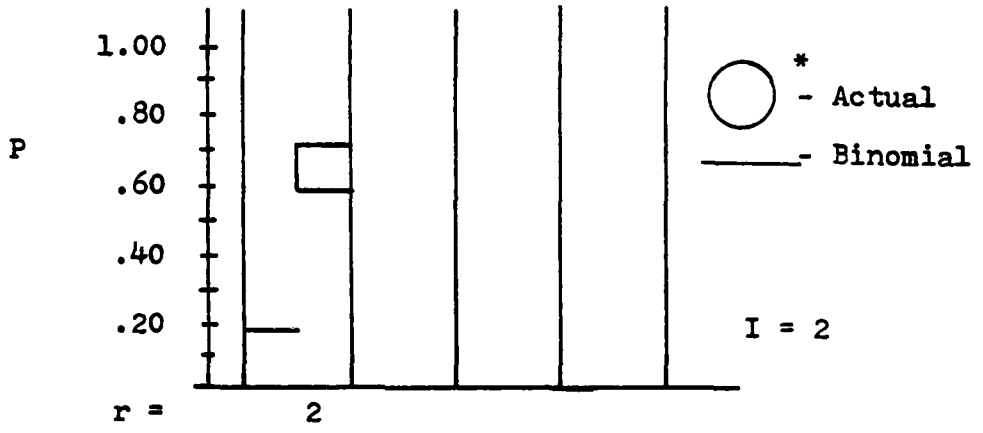
distinguishable from and greater than the random binomial assignment probabilities. The two instances where the actual and binomial probabilities are not distinguishable are for TAC, at least 2 of 5 assignments and for ATC, at least 2 of 5 assignments (Figures 10 and 18). For each of these instances the behavior of the binomial trend must be considered (11:297).

As the population proportion of the MAJCOM, upon which the random binomial trend is based, decreases, the modal distribution of the binomial skews right. This increases the probability of spending only a few of a career of many assignments in the MAJCOM of initial duty. However, it also increases the cumulative probability of spending <u>at least</u> a few of many assignments in the MAJCOM of initial assignment. As the MAJCOM population proportion approaches 0.50, the modal distribution of the binomial approaches normal, and the greatest probability of assignment history would be for half the career assignments to be in the initial MAJCOM. Thus, in a cumulative distribution, the probability of spending at least a few assignments from a career of many assignments in the MAJCOM of initial assignment increases. Finally, as the MAJCOM population proportion becomes greater than 0.50, the binomial distribution skews left, increasing the probability of spending many assignments out of a career of many assignments in the MAJCOM of initial duty. Thus, once more, the cumulative

Actual vs. Random Binomial Assignment

Trend for Aircraft Maintenance:

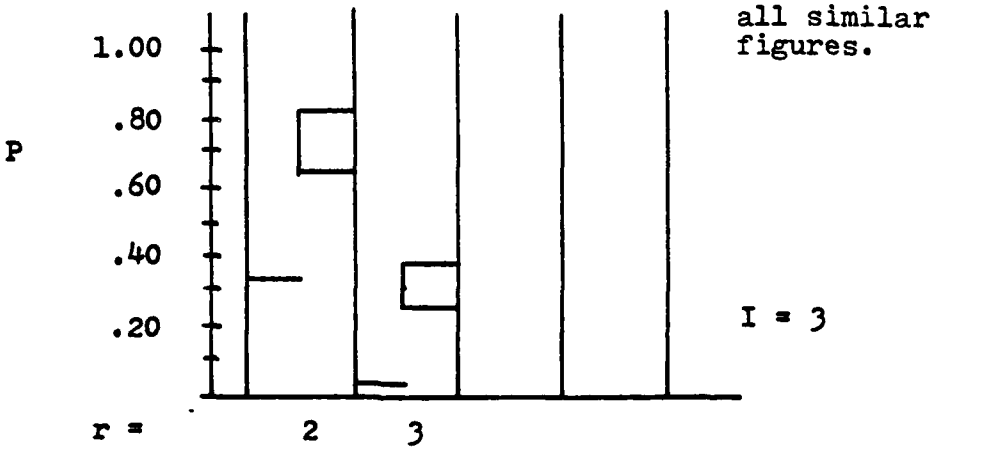
MAC, I = 2 & 3



At least r of i

Figure 3

*Actual assignments are area bands: binomial assignments are discrete probabilities. This convention used in all similar figures.



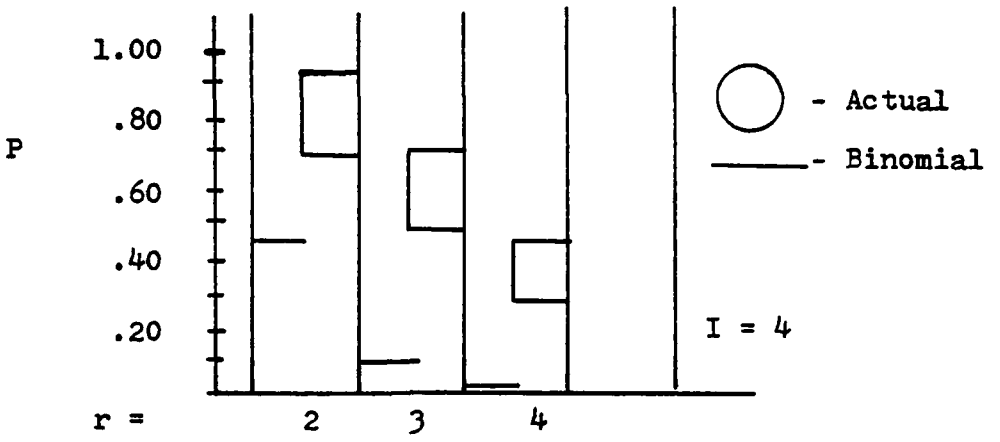
At least r of i

Figure 4

Actual .vs. Random Binomial Assignment

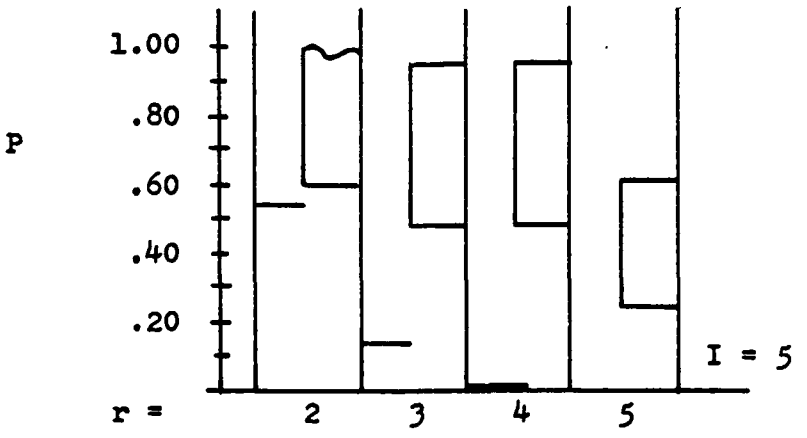
Trend for Aircraft Maintenance:

MAC, I = 4 & 5



At least r of i

Figure 5



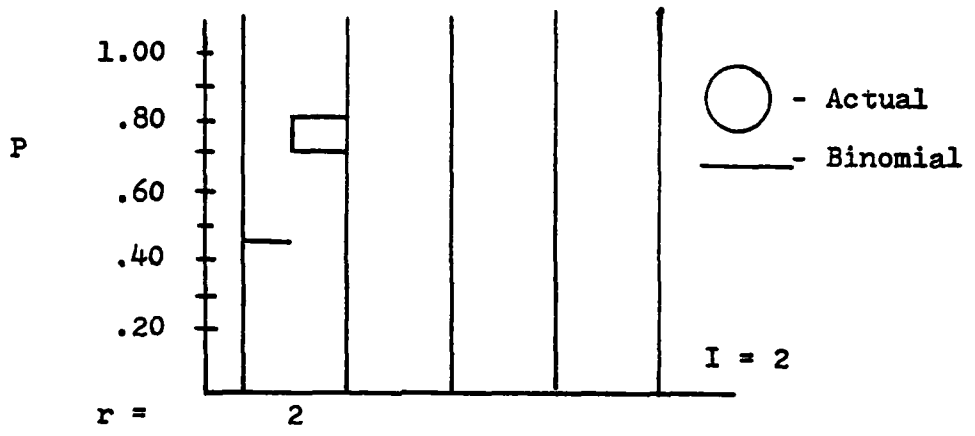
At least r of i

Figure 6

Actual .vs. Random Binomial Assignment

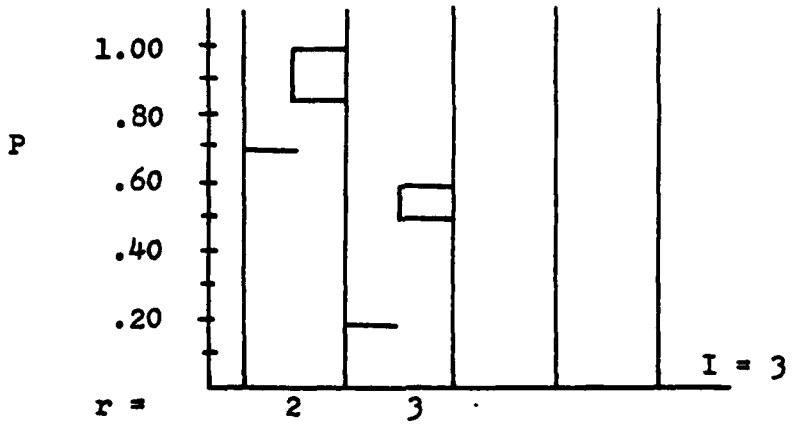
Trend for Aircraft Maintenance:

TAC, I = 2 & 3



At least r of i

Figure 7



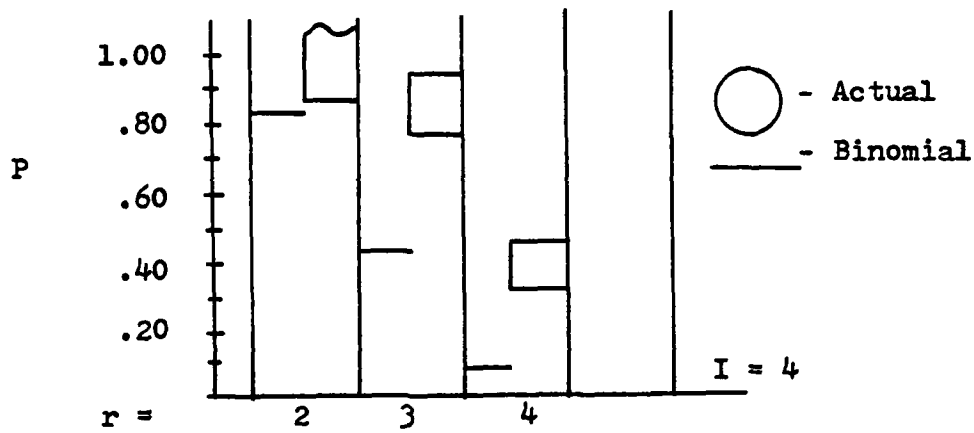
At least r of i

Figure 8

Actual .vs. Random Binomial Assignment

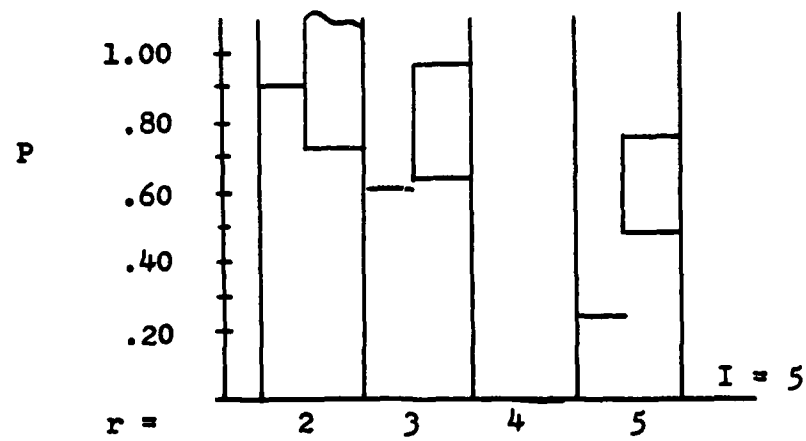
Trend for Aircraft Maintenance:

TAC, I = 4 & 5



At least r of i

Figure 9



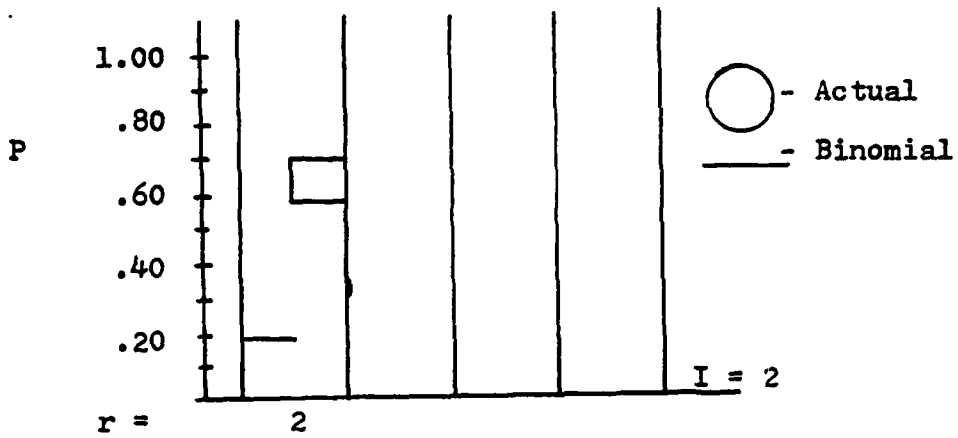
At least r of i

Figure 10

Actual .vs.Random Binomial Assignment

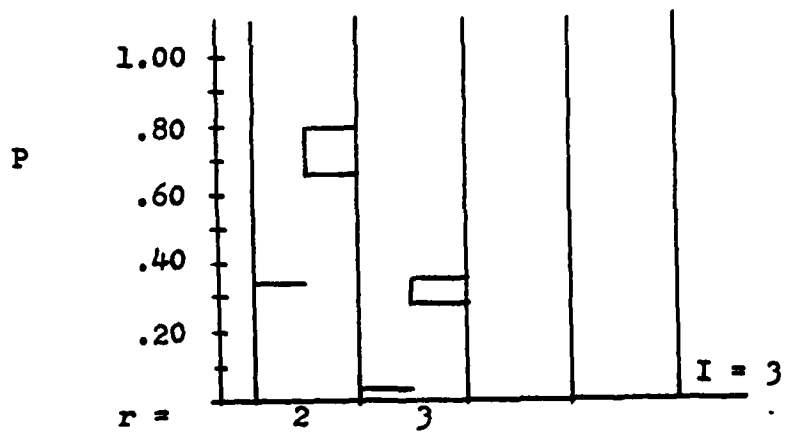
Trend for Aircraft Maintenance:

SAC, I = 2 & 3



At least r of i

Figure 11



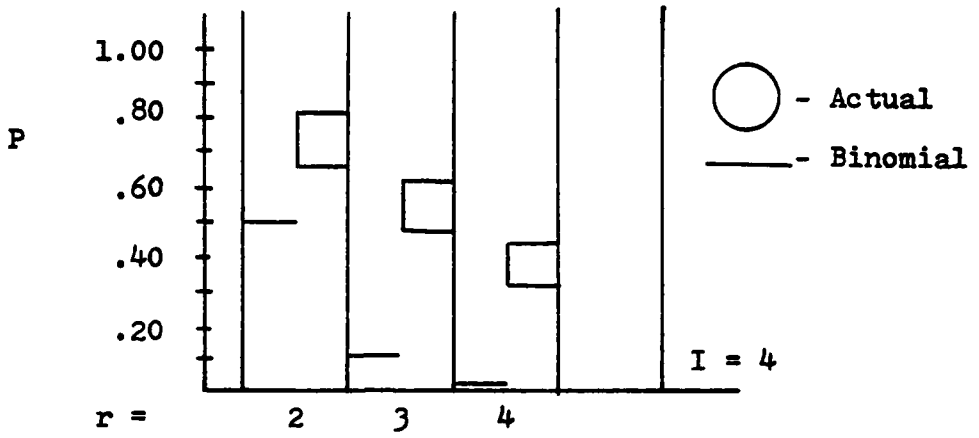
At least r of i

Figure 12

Actual .vs. Random Binomial Assignment

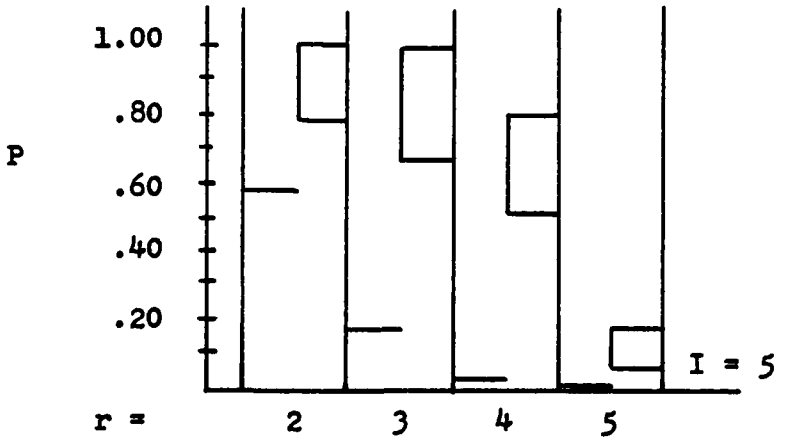
Trend for Aircraft Maintenance:

SAC, I = 4 & 5



At least r of i

Figure 13



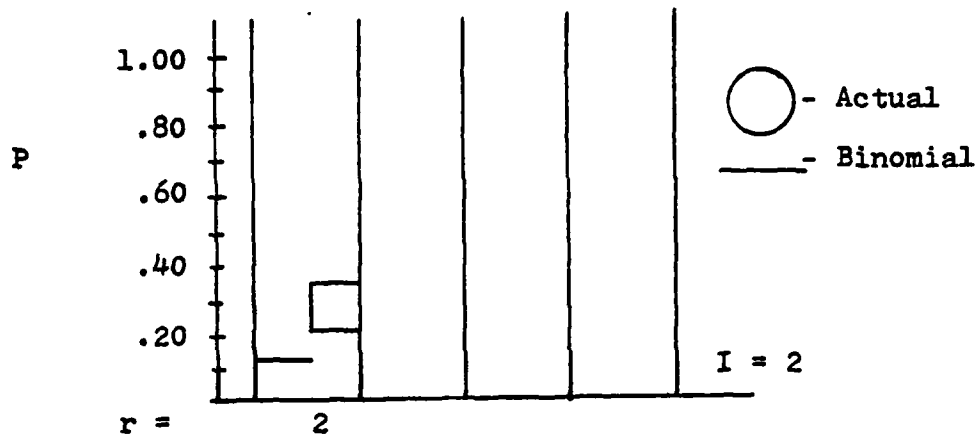
At least r of i

Figure 14

Actual .vs. Random Binomial Assignment

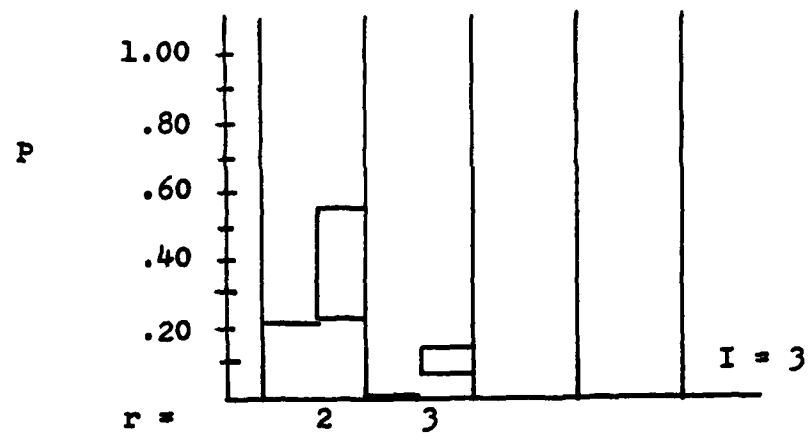
Trend for Aircraft Maintenance:

ATC, I = 2 & 3



At least r of i

Figure 15



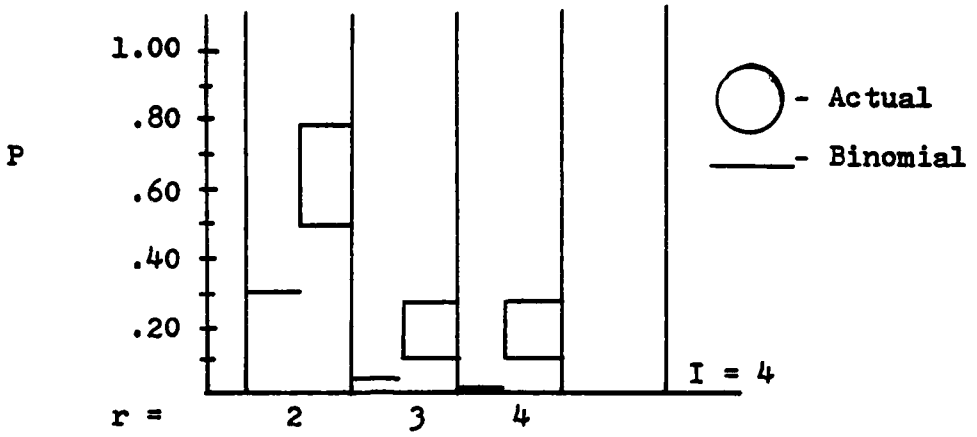
At least r of i

Figure 16

Actual .vs. Random Binomial Assignment

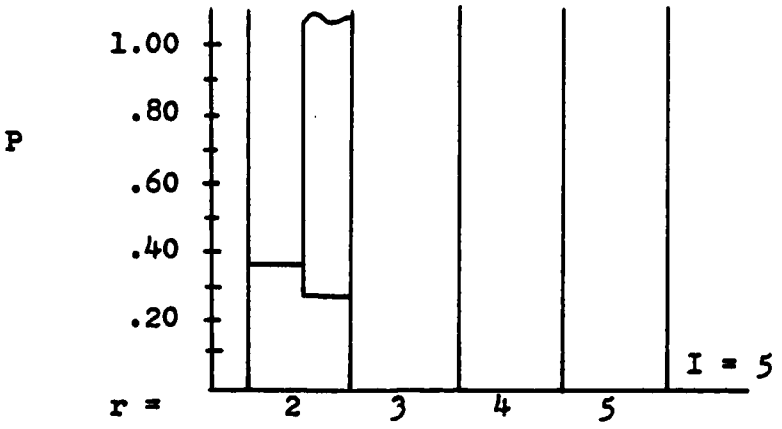
Trend for Aircraft Maintenance:

ATC, I = 4 & 5



At least r of i

Figure 17



At least r of i

Figure 18

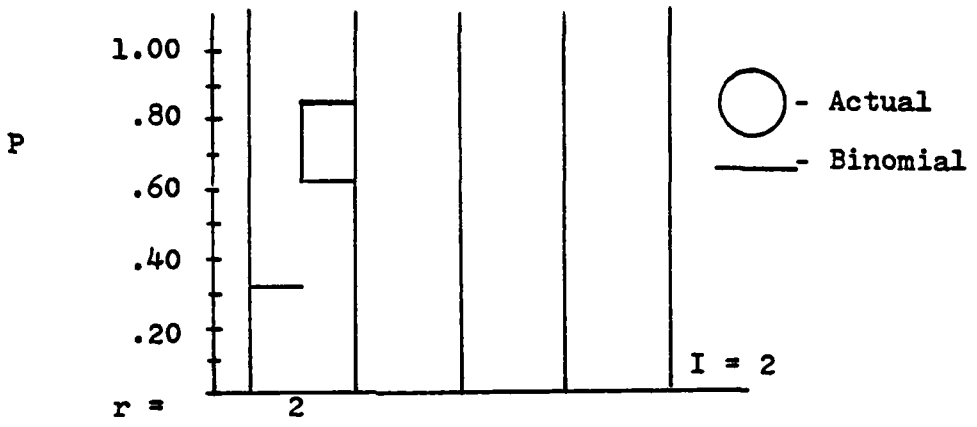
probability of spending at least a few of many assignments in the MAJCOM of initial duty increases. Thus, for any given population proportion, as the number of assignments in a career increases, the probability of spending at least a few of those assignments in the MAJCOM of initial duty increases. In the two instances cited the population proportion of ATC is 0.11 and the population proportion of TAC is 0.45. In both instances it appears that, for the random binomial assignment trend, it would be expected to find a relatively large percentage of cases spending at least two of five assignments in the initial MAJCOM while the data indicate that in TAC and ATC the actual trends meet but do not exceed these expectations, at least, at the confidence level of 0.10.

Graphs of Pilot Actual and Binomial Trends

Figures 19 through 34 are the graphical comparison of the random binomial and actual assignment trends for the Pilot career field for 2, 3, 4, and 5 assignment careers as listed in Tables 10 through 13. It will be recalled that the Pilot career field was selected as a standard of comparison for the AMO career field. It is universally perceived that succeeding assignments in the Pilot career field are highly dependent on the MAJCOM of the initial duty assignment, e.g., that there is a strong trend for

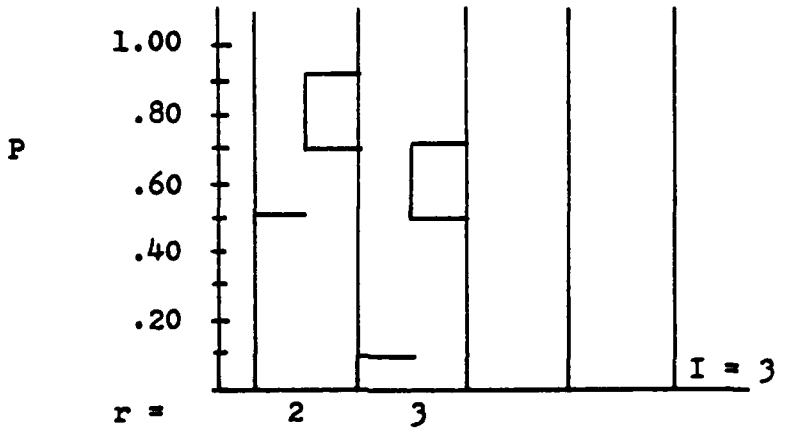
Actual .vs. Random Binomial Assignment

Trend for Pilots: MAC, I = 2 & 3



At least r of i

Figure 19

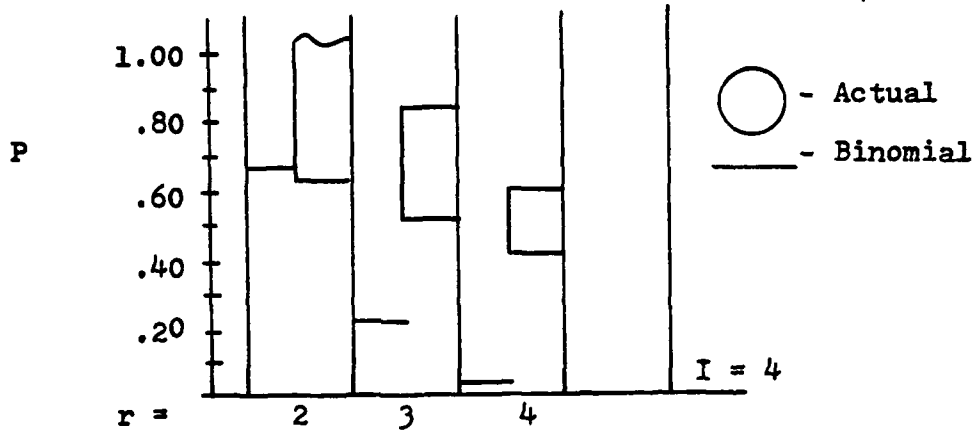


At least r of i

Figure 20

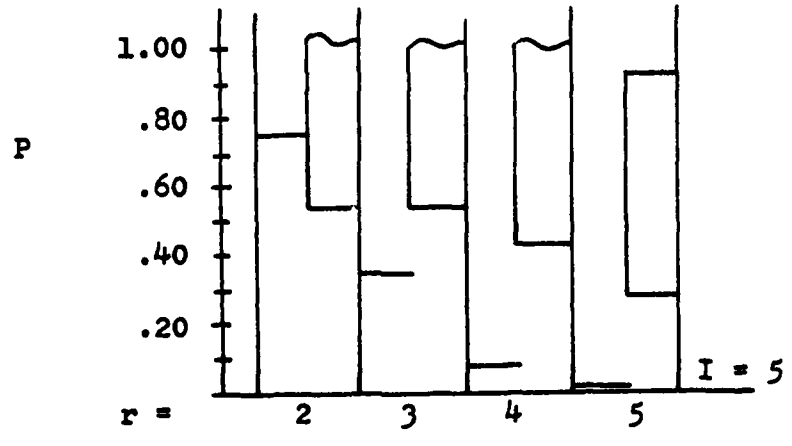
Actual .vs. Random Binomial Assignment

Trend for Pilots: MAC, I = 4 & 5



At least r of i

Figure 21

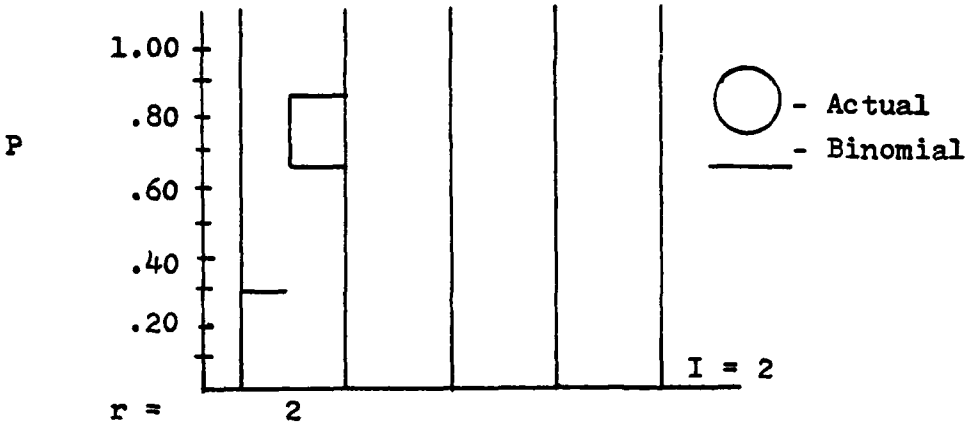


At least r of i

Figure 22

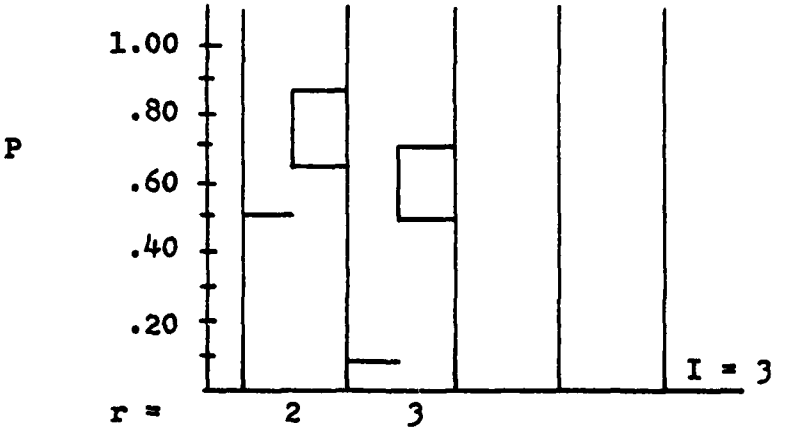
Actual .vs. Random Binomial Assignment

Trend for Pilots: TAC, I = 2 & 3



At least r of i

Figure 23

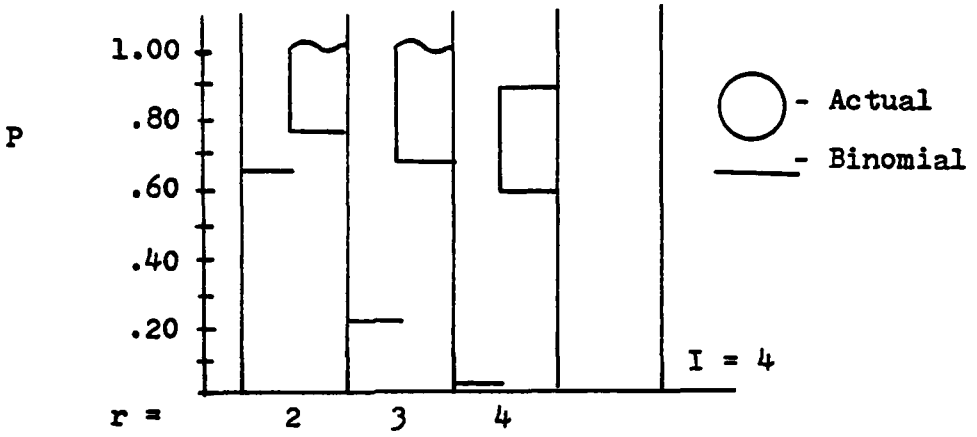


At least r of i

Figure 24

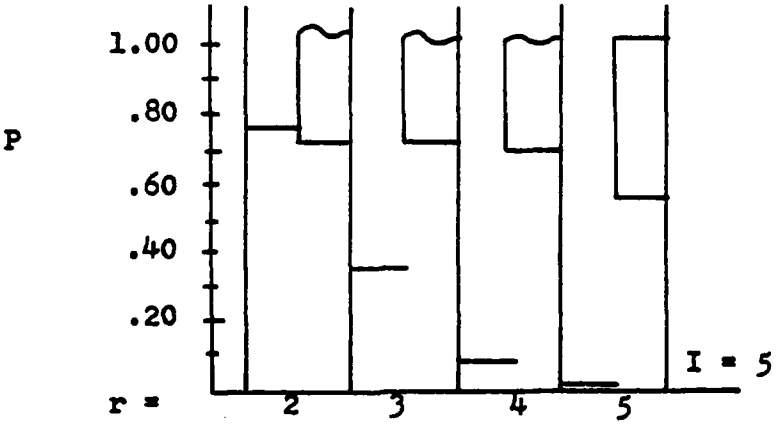
Actual .vs. Random Binomial Assignment

Trend for Pilots: TAC, I = 4 & 5



At least r of i

Figure 25

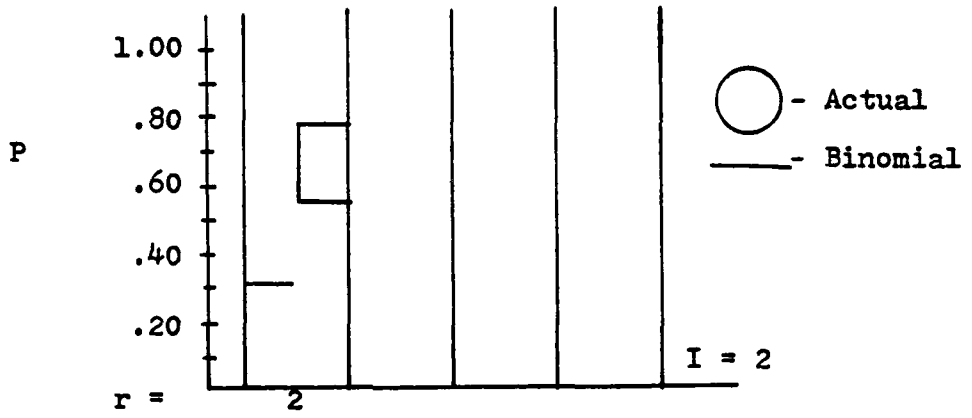


At least r of i

Figure 26

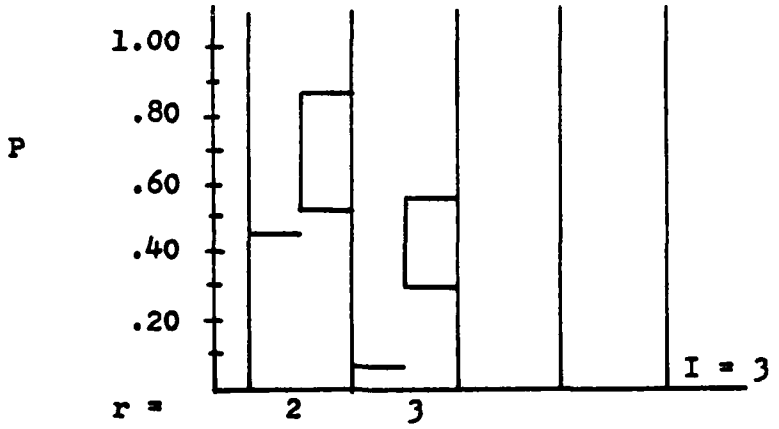
Actual .vs. Random Binomial Assignment

Trend for Pilots: SAC, I = 2 & 3



At least r of i

Figure 27

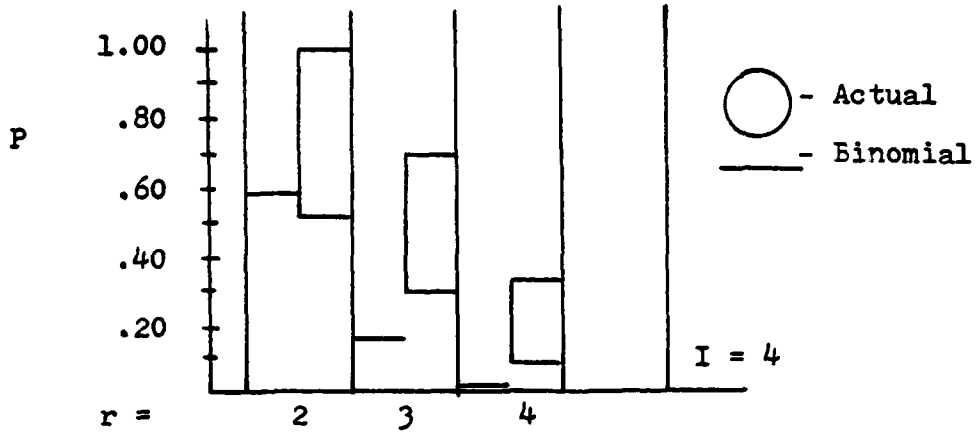


At least r of i

Figure 28

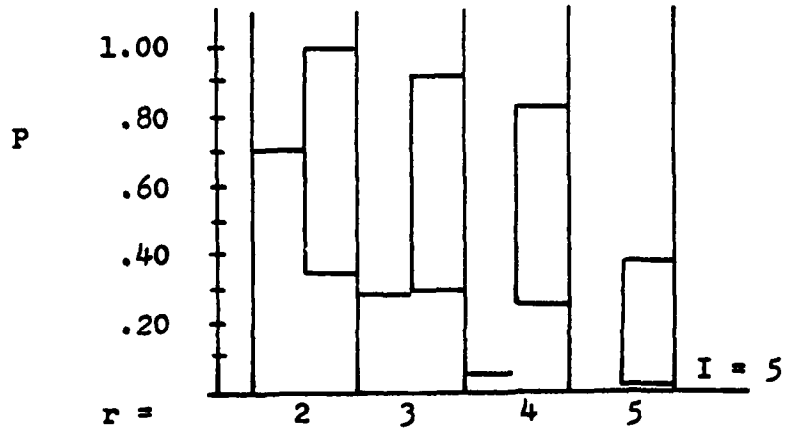
Actual .vs. Random Binomial Assignment

Trend for Pilots: SAC, I = 4 & 5



At least r of i

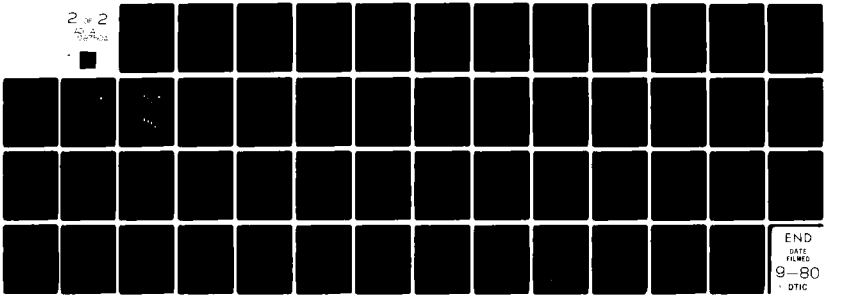
Figure 29



At least r of i

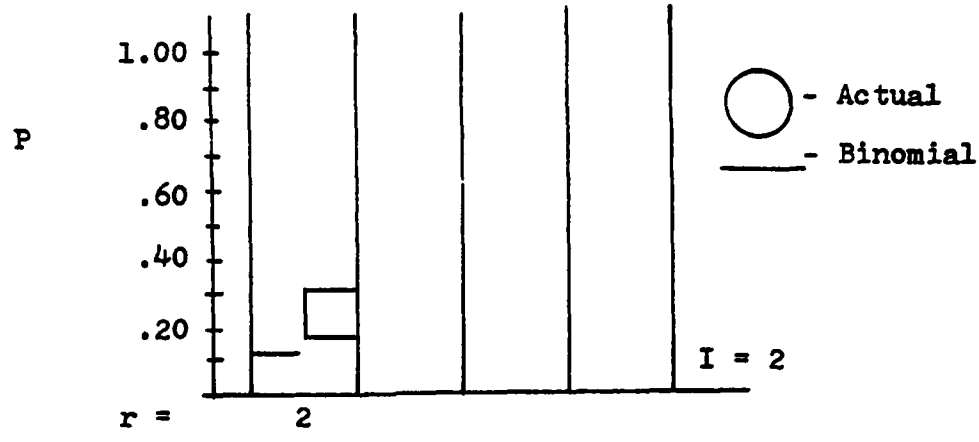
Figure 30

AD-A087 504 AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL--ETC F/G 5/9
RELATIONSHIP BETWEEN THE INITIAL DUTY ASSIGNMENT AND SUCCESSIVE--ETC(U)
JUN 80 E D MAYFIELD, R W WALTER
UNCLASSIFIED AFIT-LSSR-30-80 NL



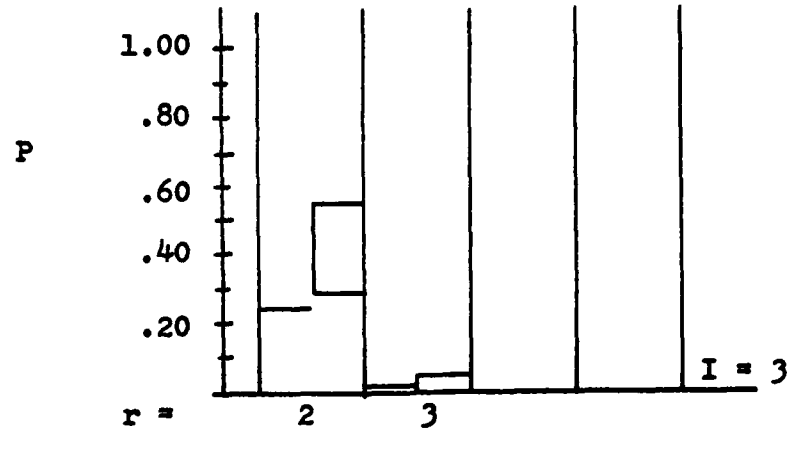
Actual .vs. Random Binomial Assignment

Trend for Pilots: ATC, I = 2 & 3



At least r of i

Figure 31

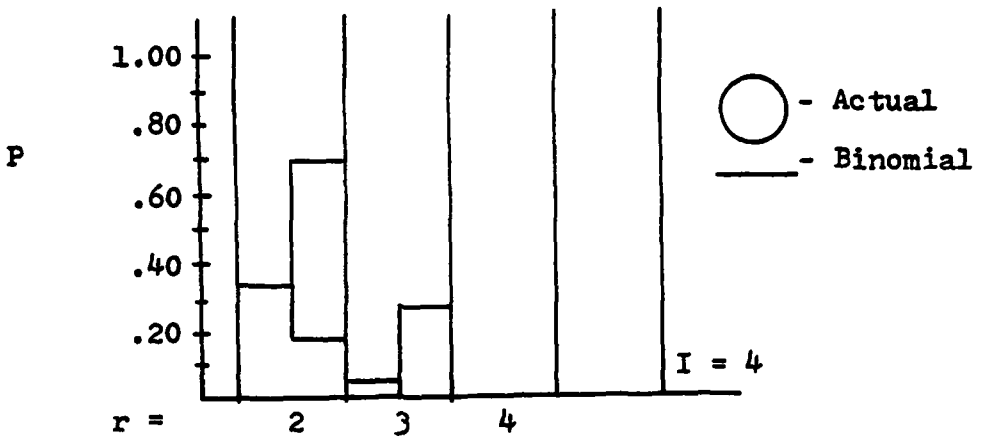


At least r of i

Figure 32

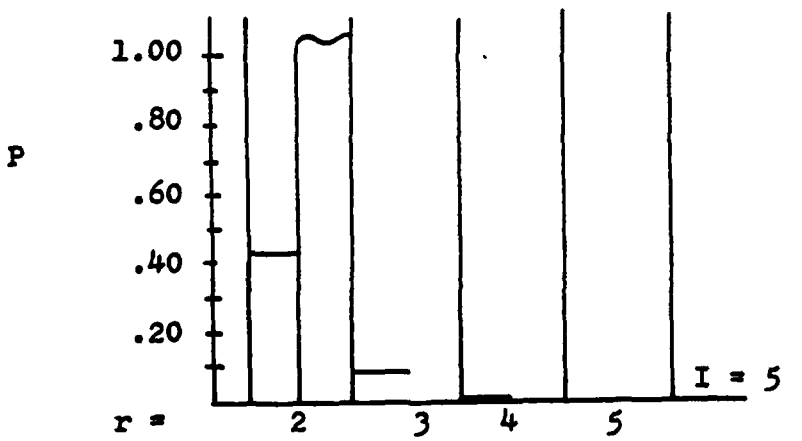
Actual .vs. Random Binomial Assignment

Trend for Pilots: ATC, I = 4 & 5



At least r of i

Figure 33



At least r of i

Figure 34

pilots to receive succeeding assignments in the MAJCOM of initial assignment. As can be seen in Figures 19 through 32, actual assignment trend probabilities for the Pilot career field are consistantly distinguishable from and greater than the random binomial assignment probabilities except for the at least 2 of 4 and 2 of 5 categories for each MAJCOM (Figures 21, 22, 26, 29, 30, 33, 34). These exceptions more consistantly exhibit the same tendency shown in the AMO career field for TAC and ATC. As such, the same reasoning as to the behavior of the binomial dsitribution applies to the pilot career field.

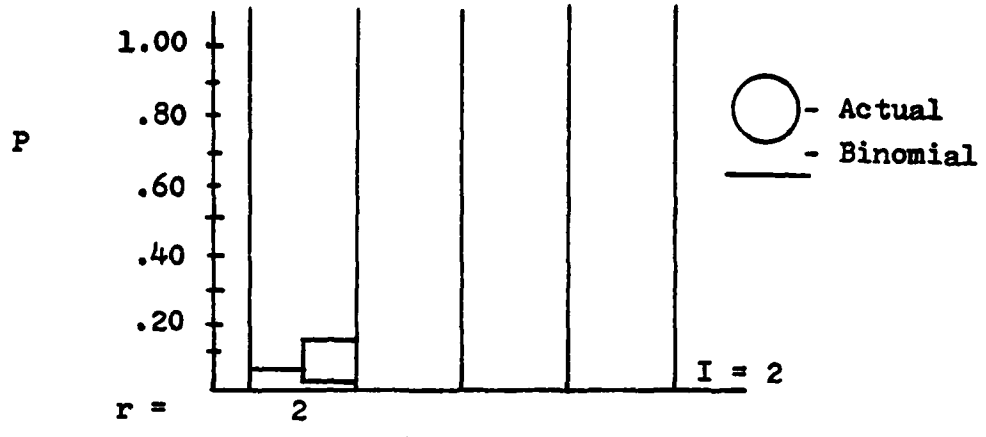
Graphs of CEO Actual and Binomial Trends

Figures 35 through 50 are the graphical comparisons of the random binomial and actual assignment trends for the CEO career field for 2, 3, 4, and 5 assignment careers as listed in Tables 10 through 13. It will be recalled that the CEO career field was selected as a standard of comparison for the AMO career field. It is universally perceived that succeeding assignments in the CEO career field are <u>not</u> dependent on the MAJCOM of the initial duty assignment, e.g. that there is no trend for CEOs to receive succeeding assignments in the MAJCOM of initial assignment. As can be seen in Figures 35 through 50, the relationship between the actual and binomial assignment probabilities is most varied. The actual and binomial trends are indistinguishable for

Actual .vs. Random Binomial Assignment

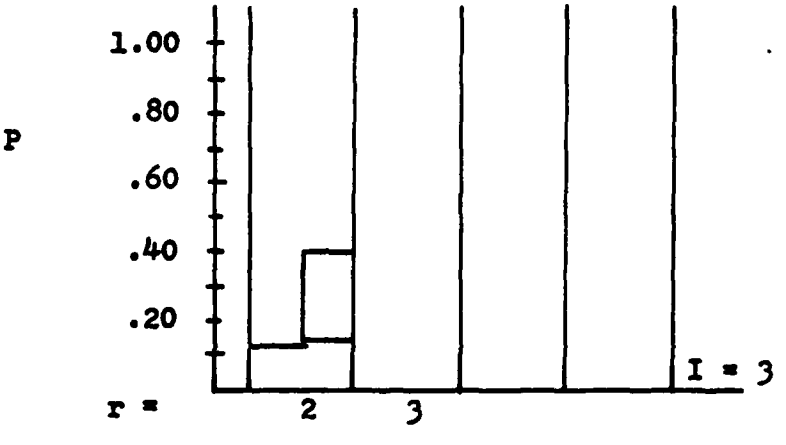
Trend for Civil Engineers:

MAC, I = 2 & 3



At least r of i

Figure 35



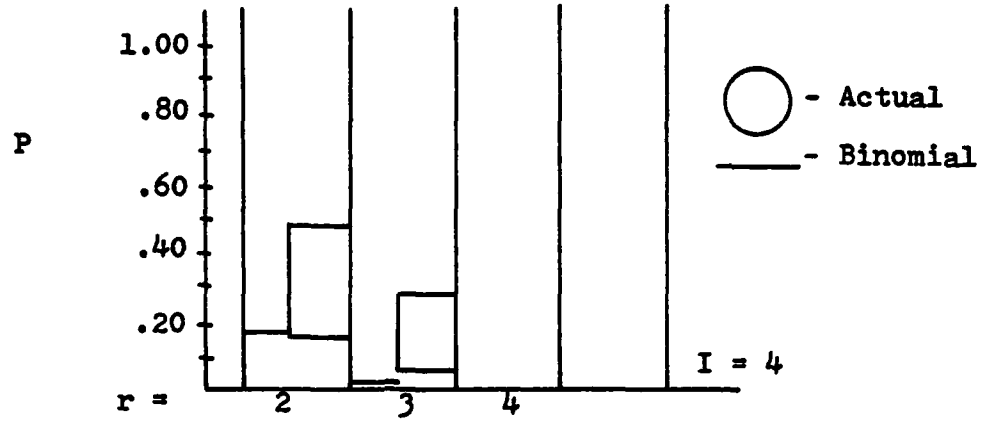
At least r of i

Figure 36

Actual .vs. Random Binomial Assignment

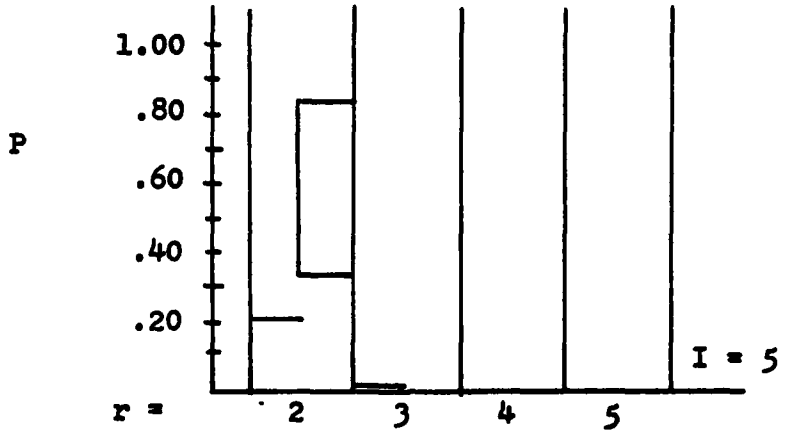
Trend for Civil Engineers:

MAC, I = 4 & 5



At least r of i

Figure 37



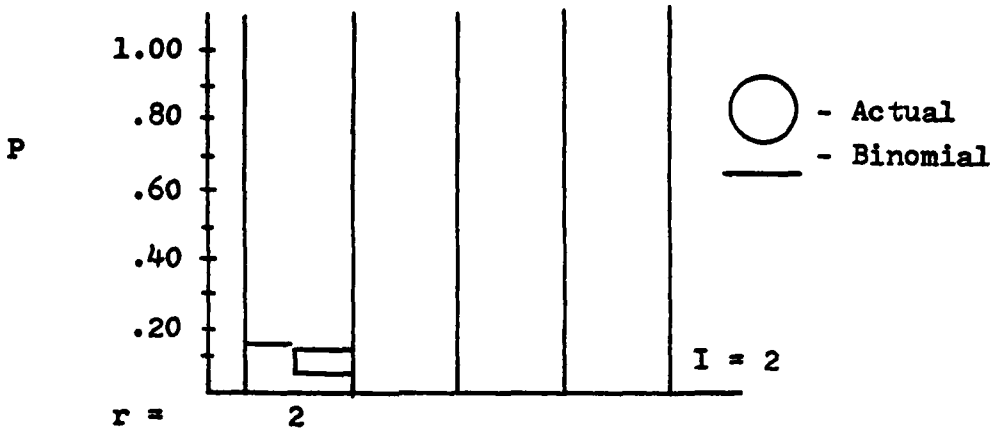
At least r of i

Figure 38

Actual .vs. Random Binomial Assignment

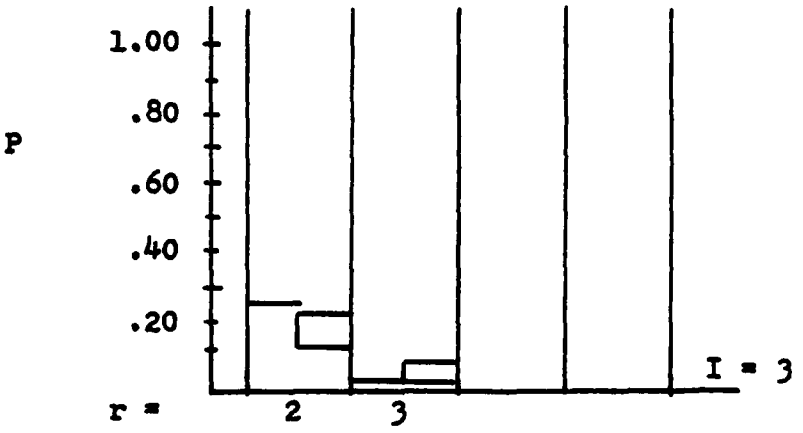
Trend for Civil Engineers:

TAC, I = 2 & 3



At least r of i

Figure 39



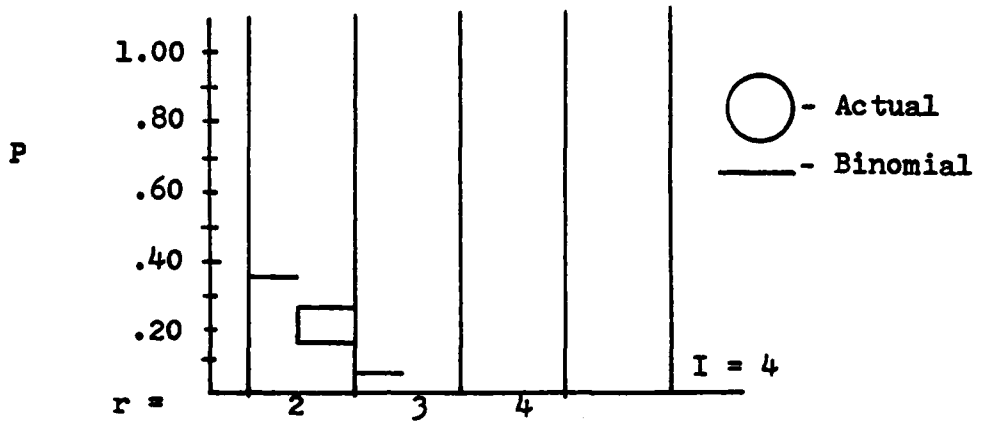
At least r of i

Figure 40

Actual .vs. Random Binomial Assignment

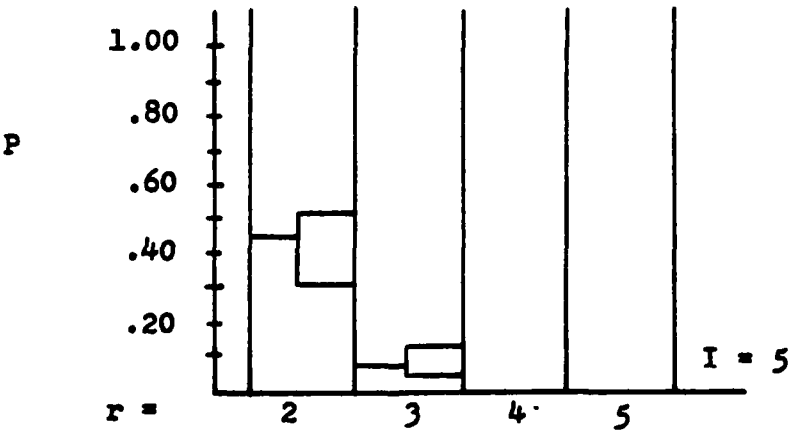
Trend for Civil Engineers:

TAC, I = 4 & 5



At least r of i

Figure 41



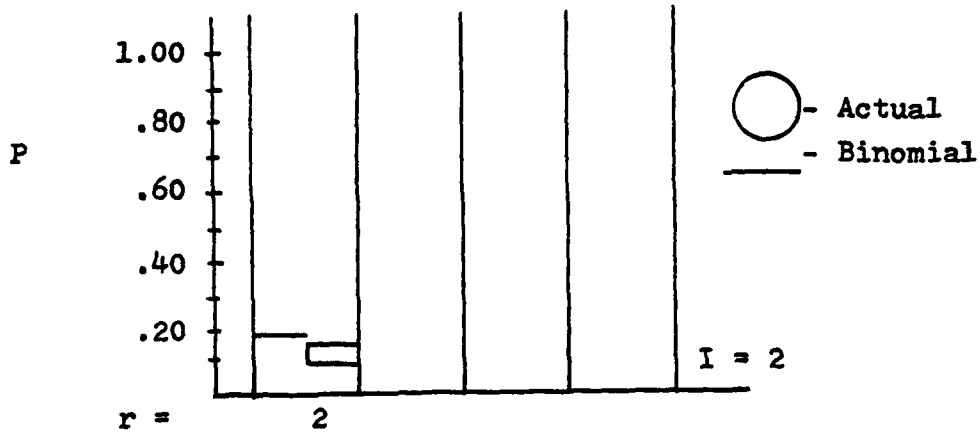
At least r of i

Figure 42

Actual .vs. Random Binomial Assignment

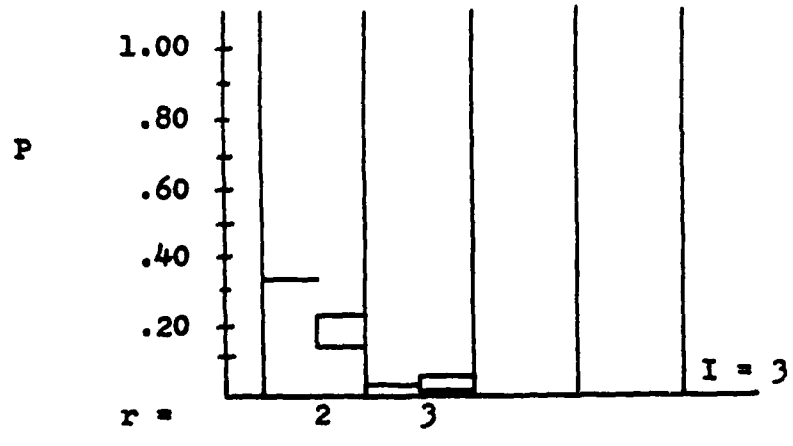
Trend for Civil Engineers:

SAC, I = 2 & 3



At least r of i

Figure 43



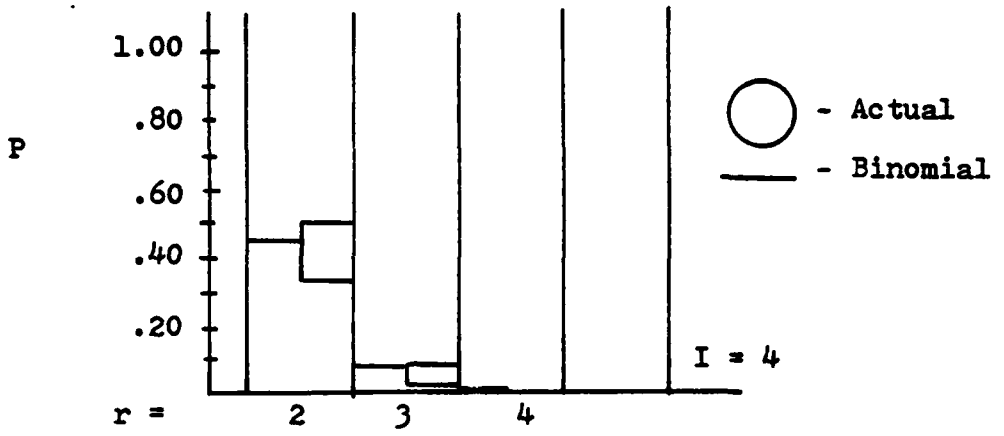
At least r of i

Figure 44

Actual .vs. Random Binomial Assignment

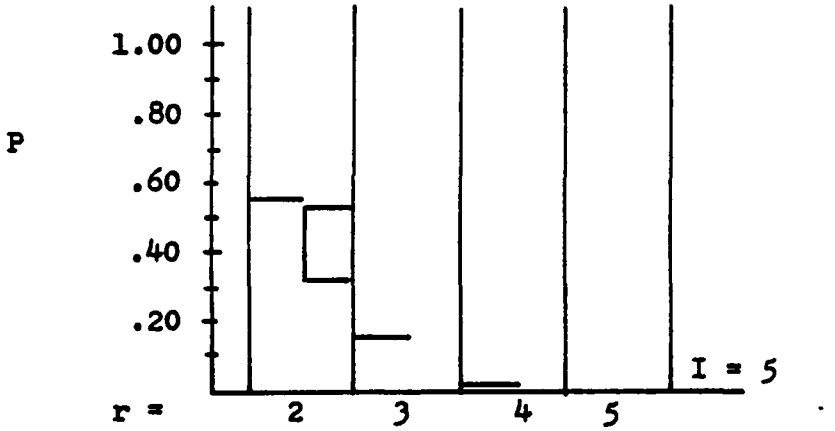
Trend for Civil Engineers:

SAC, I = 4 & 5



At least r of i

Figure 45



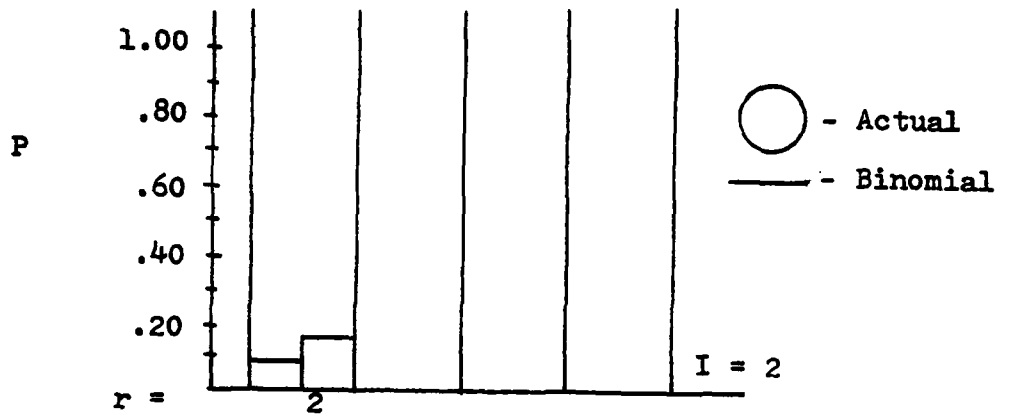
At least r of i

Figure 46

Actual .vs. Random Binomial Assignment

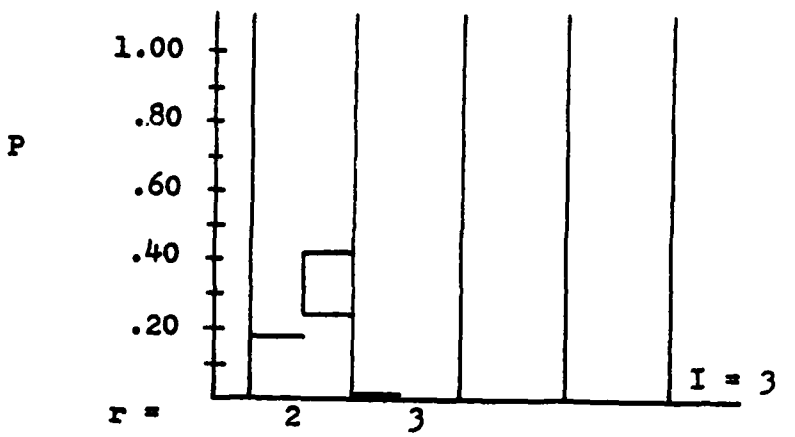
Trend for Civil Engineers:

ATC, I = 2 & 3



At least r of i

Figure 47



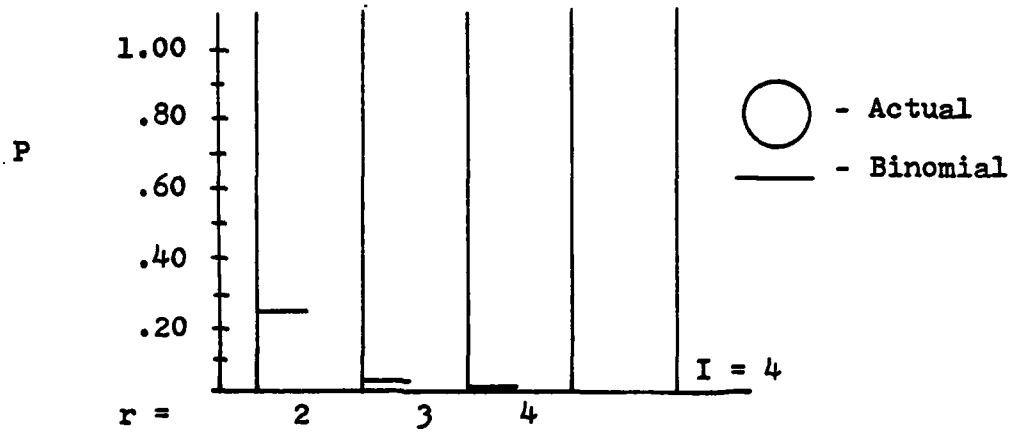
At least r of i

Figure 48

Actual .vs. Random Binomial Assignment

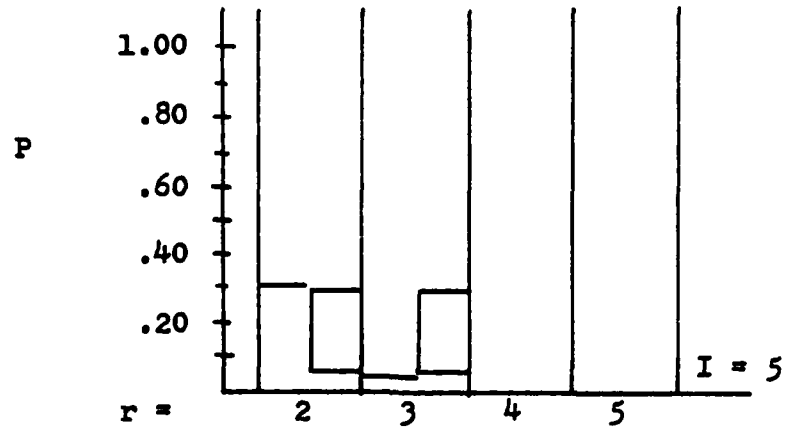
Trend for Civil Engineers:

ATC, I = 4 & 5



At least r of i

Figure 49



At least r of i

Figure 50

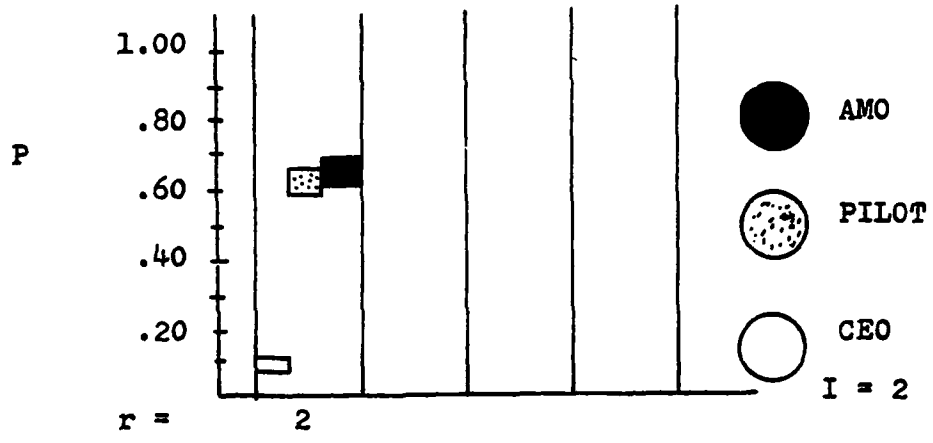
the MAC 2 of 2, 3 of 3, 2 of 4, 4 of 4, 4 of 5, 5 of 5, TAC 3 of 3, 4 of 4, 2 of 5, 3 of 5, 4 of 5, 5 of 5, SAC 3 of 3, 2 of 4, 3 of 4, 5 of 5, ATC 2 of 2, 4 of 5, and 5 of 5 assignment histories. The actual trend is distinguishable from and greater than the random trend for the MAC 2 of 3, 3 of 4, 2 of 5, ATC 2 of 3, and 3 of 5 assignment histories. The actual trend is distinguishable from and less than the random trend for the MAC 3 of 5, TAC 2 of 2, 2 of 3, 2 of 4, 3 of 4, SAC 2 of 2, 2 of 3, 4 of 4, 2 of 5, 3 of 5, 4 of 5, ATC 3 of 3, 2 of 4, 3 of 4, 4 of 4, and 2 of 5 assignment histories. In all, of the forty possible assignment histories, the actual trend probabilities are indistinguishable from the random binomial trend probabilities in 47.5% of the instances, the actual probabilities are distinguishable and less than the random binomial probabilities in 40% of the instances, and the actual probabilities are distinguishable and greater than the random binomial probabilities in 12.5% of the instances. An investigation of the figures shows, however, that in those instances where the actual probabilities are distinguishable from the random binomial probabilities, the variation between the two is generally less for the CEO career field than for either the Pilot or AMO career fields.

Graphs of Actual Trends for AMO and Standards

Figures 51 through 54 are the graphical comparisons of the actual assignment trends for the AMO career field and the two standards of comparison, the Pilot career field and the CEO career field as listed in Table 14. In all instances the AMO assignment trend is clearly distinguishable from and greater than the CEO actual assignment trend.

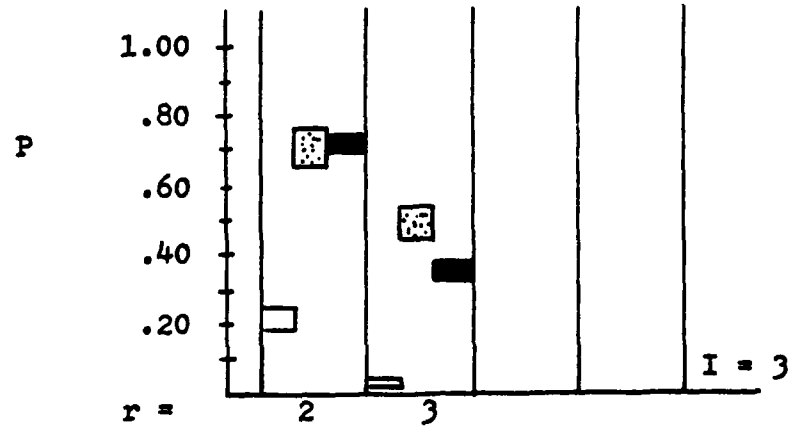
In all but three instances the AMO actual assignment trend is indistinguishable from the Pilot actual assignment trend. The three instances are for the 3 of 3, 4 of 4, and 5 of 5 assignment histories (Figures 52, 53, 54). In each instance the AMO actual assignment trend lies decidedly below the Pilot trend but still well above the CEO assignment trend.

Comparison of Aircraft Maintenance Officer
Career Field Assignment Trend with the
Pilot and Civil Engineering Officer
Career Fields Assignment Trends: I = 2 & 3



At least r of i

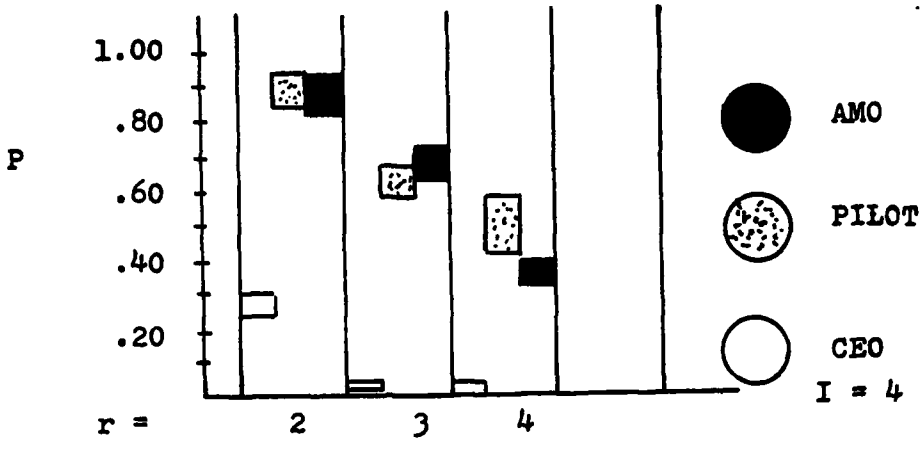
Figure 51



At least r of i

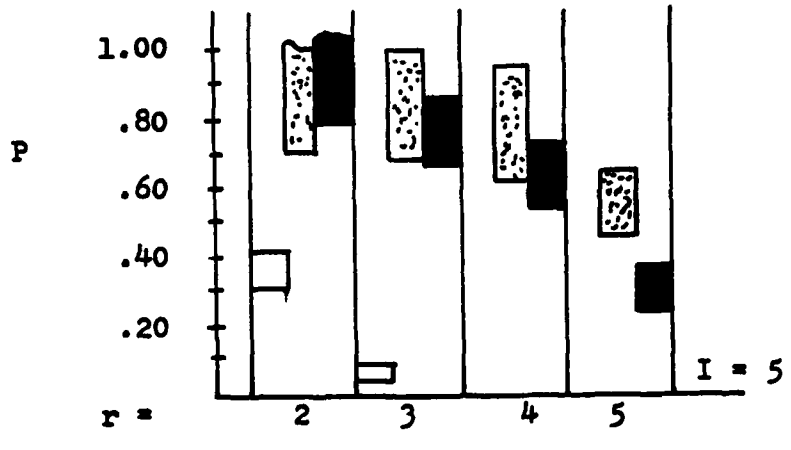
Figure 52

Comparison of Aircraft Maintenance Officer
Career Field Assignment Trend with the
Pilot and Civil Engineering Officer
Career Fields Assignment Trends: I = 4 & 5



At least r of i

Figure 53



At least r of i

Figure 54

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

This thesis tested the research hypothesis: A trend exists for Aircraft Maintenance Officers to receive assignments in the MAJCOM of initial duty assignment. The results of the research support the research hypothesis. However, two points must be discussed as to the methodology of the research to keep the conclusions in proper perspective.

In the "Population Description" the method of estimating the minimum size of each data set was described. This method was based on partitioning the career fields by the number of assignments in a career. The partitioning assumed a standard time-in-grade and assignment length, and, also, it assumed that all assignments in a career were in the career field of interest. Based on the results displayed in Figures 1 and 2, it appears that these assumptions do result in a reasonable estimate for data set size. However, for a general application of this estimating method, the results may vary for career fields having a large portion of cross trainee officers (i.e. 1st lieutenants and captains on the initial duty assignment) or for career

fields where the typical duty assignment length tends to be shorter or longer than the assumed three years. It should also be noted that this estimating method was developed because of the inability to extract computerized personnel records based on the number of career assignments, and that while the desired accuracy was obtained at the career field level, further partitioning to the MAJCOM level resulted in reduced accuracy. It would appear that there are two ways to increase the accuracy of the data set at the MAJCOM level:

1) Take a point in time census of the career field
2) Devise a computer technique that can identify officers by the number of assignments in a career. This would reduce the required size of the data set.

The second point of discussion concerns the formulation and application of the decision criteria for inclusion into a population. The decision criteria were established to identify each duty assignment by career field, MAJCOM, and duty. It is emphasized that, in many instances, the application of the decision criteria required the subjective judgement of the researcher. The decision criteria themselves were intended to reduce the effect of that subjectivity, but where judgement was required, a philosophy of conservatism aimed at exercising the research hypothesis was used to further reduce the effect of researcher

subjectivity. The effects of such subjectivity not withstanding, the authors believe that the data analysis was sufficiently objective to support the validity of the study.

To test if the results of the analysis would support the research hypothesis, three decision rules, posed in the form of questions, were posited:

1) Does a statistical correlation exist between the MAJCOM of initial duty assignment and the MAJCOM of subsequent assignments?
2) If this correlation exists, can it be distinguished from a random correlation?
3) If this correlation exists and can be distinguished from a random correlation, does it conceptually indicate a trend for Aircraft Maintenance Officers to remain in the MAJCOM of initial duty assignment?

To support the research hypothesis all three questions must be answered in the affirmative.

Tables 4 and 5 show that as the number of career assignments increase, there is a general decrease in the number of officers being reassigned to the MAJCOM of initial duty. This indicates that a correlation, as yet undefined, does exist for the career field between the initial MAJCOM and subsequent assignments. Thus, question 1 is answered in the affirmative.

Answering question 2 entails a major part of this study. Figures 2 through 18 show graphical presentations

of the actual and the binomial assignment trends for AMOs. These figures clearly demonstrate that in all but two instances the actual assignment trend is distinguishable from the expected trend that would be produced by a random (binomial) assignment policy. As discussed in the "Results", the behavior of the binomial trend must be accounted for when considering the two instances where the actual and binomial assignment trends are not distinguishable. That is, that as the number of assignments in a career increase, the cumulative binomial probability of spending a small number of those assignments in the initial MAJCOM increases. Thus the likelihood of nondistinguishable actual and binomial trends early in a long (number of assignments) career would increase even in the presence of a highly non random assignment trend. From a practical standpoint, then, it is correct to conclude that the AMO actual assignment trend is distinguishable from the random assignment trend. Thus, question 2 is answered in the affirmative.

The answer to question 3 partially follows from observing the same figures (2 through 18) used to answer question 2. It can readily be seen that where the actual trend is distinguishable from the binomial trend, it is also greater than the binomial trend. But, determining that the actual trend is greater than the binomial trend is not sufficient to conclude an affirmative answer to question 3. Thus the Pilot and CEO career fields were used to put any

AMO assignment trend into the context of known and accepted assignment trends. The validity of these two standards is presented in Figures 19 through 50. The pilot career field (Figures 19 through 34) actual assignment trend is distinguishable and greater than the binomial trend except in the early stages of the longer careers. This is the same tendency, but somewhat stronger, that appeared fro the AMO's. Thus the assignment trend for the Pilot career field may be considered to be dependent on the MAJCOM of initial duty assignment. Figures 35 through 50 show that the CEO actual assignment trend is less than or indistinguishable from the binomial trend in 87.5% of the possible assignment instances. Thus the actual CEO assignment trend may be considered as being <u>not</u> dependent on the MAJCOM of initial duty. Thus, having validated the standards, the AMO career field assignment trend was compared to them.

Five possible outcomes of the comparison of the AMO trends with the standards and the implications of each were discussed in the Informational Model. These were:

1. <u>The confidence interval for the AMO assignment trend intersects the confidence interval for one of the standards</u>. When the intersection is with the pilot standard, it supports the inference that the trend displayed by the actual AMO assignment data is high (both absolutely and relatively). When the intersection occurs with the CEO standard, it

supports the inferrence that the trend displayed by the actual AMO assignment data is not strong.

2. The confidence interval for the AMO assignment trend does not intersect the confidence for either standard but lay wholly above the cumulative probability function for the Pilot standard. When this occurs it is inferred that the trend displayed by the actual AMO assignment data is high.

3. The confidence interval for the AMO assignment trend intersects the confidence intervals for both standards. When this occurs, inferrences as to the strength of trend to support a perception are indeterminate.

4. The confidence interval for the AMO assignment trend intersects neither standard's confidence interval and the actual AMO cumulative distribution function lay between the standards. When this occurs, inferrences as to the strength of the trend to support a perception of a trend are indeterminate.

5. The confidence intervals for the two standards themselves intersect. When this occurs, there is no significant differences between assignment trends perceived as being MAJCOM oriented and assignment trends perceived as being non-MAJCOM oriented. Conclusions of trend must then be wholly dependent

on evaluation of the 402X trend line with the binomial trend line.

Figures 51 through 54 show that outcomes 1 and 4 occurred. In outcome 1, 11 of the 14 possible AMO assignment histories were indistinguishable from the Pilot trend. The three exceptions, representing outcome 4, were indeterminate yet significantly greater than the CEO trend. It is therefore reasonable to infer that AMO's have nearly as great a tendency to be reassigned to the MAJCOM of initial duty as do Pilots. This inference leads to the conclusion that the actual AMO assignment trend is strong enough to warrant an affirmative answer to question 3. Having met the decision rules by answering all three questions in the affirmative, the conclusion of this research is that there is sufficient evidence to support the research hypothesis. That is: A trend <u>does exist</u> for Aircraft Maintenance Officers to receive subsequent assignments in the MAJCOM of initial duty assignment. The implications of accepting the research hypothesis must be related to the hierarchy of abstraction leading to the formulation of the research hypothesis.

The research hypothesis was presented as the cornerstone of a hierarchy of explanatory hypotheses concerning problems in the AMO career field. This hierarchy is reiterated:

Cause	Leads to	Effect (or Conclusion)
1. There is a lack of proper training for Aircraft Maintenance Officers.		There is a loss of assignment potential and flexibility for Aircraft Maintenance Officers.
2. Training of Aircraft Maintenance Officers is accomplished in an unintegrated pell-mell manner.		Officers are unprepared for broad higher level management positions.
3. Training, specialized to the MAJCOM, is given to the Aircraft Maintenance Officer on his initial duty assignment.		There is a trend for Aircraft Maintenance Officers to receive assignments in the MAJCOM of initial duty assignment.

Given the acceptance of the research hypothesis and recognizing that it is the effect of explanatory hypothesis 3, the next step in investigating "problems in the AMO career field" would be to test the corresponding hypothesized cause. Is the MAJCOM conducted training for AMO's specialized to the particular needs, weapons systems, practices, etc. of that MAJCOM? If this is verified then the cause and effect relationship between specialized training and assignment trends may be tested. In this manner a factual basis is established for research to progress up the hierarchy.

Recommendations

Further research in this area could take two directions:

1) The conclusions presented here could be strengthened or discredited by improving the accuracy of the MAJCOM actual assignment trend probabilities or by establishing a new methodology.
2) The conclusions may be accepted and used as a basis to further investigate AMO training problems.

If the first direction is taken, the authors recomment that, if a similar methodology is used, the researcher obtain a census of the AMO career field. Also, if standards of comparison are used, two new standards, each perceived as representing one of the polar assignment trends, should be adopted in order to broaden the basis of comparison. If a new methodology is devised, it is suggested a computer package designed to interface with AFMPC computer files be developed.

If this thesis' conclusions are accepted and the second direction is taken, it is recommended that the perception of specialized MAJCOM training be investigated. Preliminary background research for this thesis revealed that initial upgrade training for AMOs is a major concern for the MAJCOMs and that each MAJCOM is investigating its training capabilities and programs. However, each MAJCOM

is operating independently. Another path of investigation, suggested by an informal finding, concerns the effect of explanatory hypothesis 2 from the hierarchy of abstraction. That effect states that AMO's are unprepared for higher level management position. It was noted during the analysis that numerous company grade officers in the AMO career field hold, or have held, management positions normally reserved for field grade offices (AFSC 401X). Research into the capabilities of these company grade officers at that management level may be a method for verifying or discrediting the perception expounded in the effect of explanatory hypothesis 2.

Ending with a practical note, it is the plight of modern organizations to require management decisions before they can be thoroughly researched. Assuming for a moment that the conceptual hierarchy of hypotheses <u>does</u> exist as posited, the findings lead to the highest conceptual conclusions that AMOs are unprepared for broad based assignments in Air Force maintenance and that the Air Force suffers a lack of flexibility because of this. This research team cannot help but wonder if top Air Force leaders realize that AMO command parochialism is so prevalent or that it may be a partial cause of perceived AMO leadership deterioration. Granted, these results are tentative and only indicative of higher hypothetical problems. Even so, is this possibly better data than the current system was

established (and is maintained) under? It is hoped that this research can be extended through future AFIT research teams. Failing that, it should at least serve as a coherent think-piece for top Air Force aircraft maintenance planners when, and if, they do decide a change is necessary.

APPENDICES

APPENDIX A

DERIVING THE CONDITIONAL CUMULATIVE RANDOM BINOMIAL PROBABILITY FUNCTION

A random binomial process exists when:

1. A decision has only two possible outcomes.
2. The sum of the probabilities of the two outcomes total one.
3. Each decision is independent (12).

In modeling a binomial assignment policy the following conditions were established:

1. An assignment decision had two possible outcomes;
   a) The assignment was to MAJCOM A
   b) The assignment was not to MAJCOM A
2. The probability of assignment to MAJCOM A was equal to the population proportion of MAJCOM A, p. That is

$$p = \frac{\text{\# of AMO's in MAJCOM A}}{\text{\# of AMO's in Population}}$$

   The probability of assignment not to MAJCOM A was (1-p). Hence p+(1-p)=1
3. Each assignment decision was independent of other assignment decisions.
4. The binomial assignment policy represented a discrete process.

The probability mass function of a random binomial process is given by $P(r;i,p)=\binom{i}{r}p^r\ (1-p)^{i-r}$ where:

i = the total number of decisions in the process, in

this case the number of assignments in a career. i is an integer.

r = the number of like decisions made in the process. $0 \leq r \leq i$. r is an integer. In this case the number of assignments to MAJCOM A out of a career of n assignments.

p = the probability of a specific decision, $0 \leq p \leq 1$. In this case the probability of assignment to MAJCOM A.

Thus, P(r;i,p) gives the sum of the branches of a binomial decision tree producing r like decisions out of i decisions, each decision having a probability of p for the specific outcome. In terms of the assignment policy, P(r;i,p) gives the sum of the probabilities of spending r out of i assignments in MAJCOM A when the population proportion of MAJCOM A equals p. See Figure A-1.

The cumulative probability for spending at least r out of i assignments in MAJCOM A is:

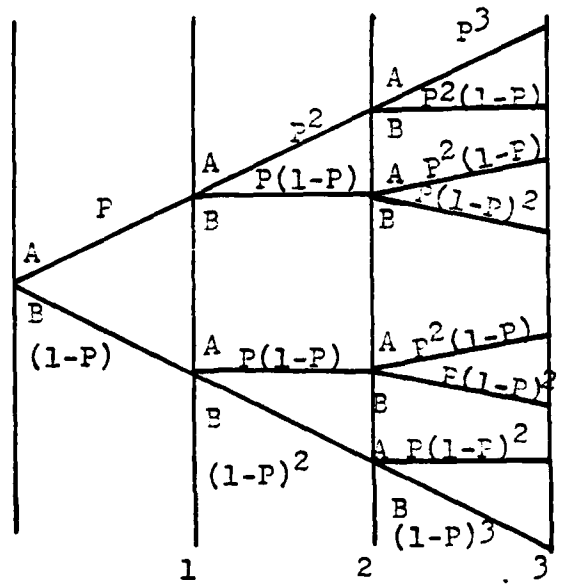
$$CP = P(r;i,p) + P(r+1;i,p) + P(r+2;n,p) = \ldots + P(I;i,p)$$

Thus, $CP = \sum_{l=r}^{i} P(l;i,p)$.

In order to accomplish the objective of the thesis, it was necessary to adjust the binomial assignment policy to incorporate the condition that the initial duty assignment was in MAJCOM A. Introducting this condition created a conditional binomial assignment process denoted by P_c = P(r;i,p| first assignment was in MAJCOM A). The effect of

this condition was to adjust the probabilities by a factor of $1/p$.

EXAMPLE OF A BINOMIAL ASSIGNMENT POLICY DECISION TREE FOR A THREE ASSIGNMENT CAREER



A = Assignment to MAJCOM A

B = Assignment not to MAJCOM A

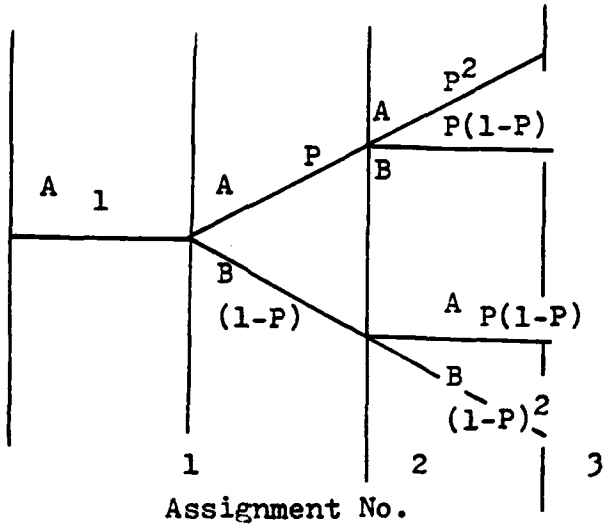
By inspection, $P(2;3,p) = p^2(1-p)+p^2(1-p)+p^2(1-p) = 3p^2(1-p)$.

By Probability Theory, $P(2;3,p) = \binom{3}{2} p^2(1-p)^{3-2} = 3p^2(1-p)$

FIGURE A-1

EXAMPLE OF A CONDITIONAL BINOMIAL ASSIGNMENT POLICY

DECISION TREE FOR A THREE ASSIGNMENT CAREER



A = Assignment to MAJCOM A

B = Assignment not to MAJCOM A

By inspection, $P_c(2;3,p)=P(1-p)+P(1-p)=2P(1-p)$

By Theory, $P_c(2;3,p)=\binom{3-1}{2-1}p^{2-1}(1-p)^{3-2}=2p(1-p)$

Cumulative Probability is given by: $CP_c=\sum_{i=x}^{n} P_c(i;n,p)$.

Where at least 2 out of 3 assignments were in A:

$CP_c=\binom{3}{2}P_c(2;3,p)=\binom{3-1}{2-1}p^{2-1}(1-p)+\binom{3-1}{3-1}p^{3-1}(1-p)^{3-3}=2p(1-p)+p^2$

FIGURE A-2

APPENDIX B

OBTAINING THE REQUIRED SIZE OF THE DATA SET

Estimating Sample Size for AMOs and CEOs (14)

Formulae to estimate the approximate sample size were obtained by algebraic manipulation of the statistical formulae to derive the approximate confidence interval for the population proportion of a large sample, for a finite population:

1) $S^2(\bar{p}) = (1-\frac{n}{N})\frac{\bar{P}(1-\bar{p})}{n-1}$

and 2) $L = \bar{p} - Z(1-\alpha/2)S(\bar{p})$

3) $U = \bar{p} + Z(1-\alpha/2)S(\bar{p})$

N = Population Size
n = Sample size
$\bar{p}$ = mean of the sampling distribution
$S^2(\bar{p})$ = Estimated Variance
$S(\bar{p})$ = Estimated Standard Deviation
L = Lower Confidence Limit
U = Upper Confidence Limit
α = Confidence level

Define h as the half width of the confidence interval, i.e. the accuracy.

$h = \bar{p}-L = U-\bar{p}$

$h = Z(1-\alpha/2)S(\bar{p})$

thus 4) $S^2(\bar{p}) = (\frac{h}{Z(1-\alpha/2)})^2$

Rearranging Equation 1):

5) $n = \frac{N(\bar{p}(1-\bar{p})+S^2(\bar{p})}{NS^2(\bar{p}) + \bar{p}(1-\bar{p})}$

Thus by utilizing equations 4 and 5 an estimate for the required sample size can be calculated for a given accuracy, confidence level and population proportion.

Estimating Sample Size for Pilots (14)

When the population is large relative to the sample size and the sample size is also large, the required sample size may be calculated using:

$$n = \frac{[Z(1-\alpha/2)]^2 p(1-p)}{h^2}$$

n = sample size
p = population proportion
h = half width of confidence interval, accuracy

When the population proportion is unknown a conservative estimate will result by setting p=0.50 since p(1-p) is maximum at p=0.50.

thus $n = \left[\frac{0.5[Z(1-\alpha/2)]}{h}\right]^2$

Estimating Career Distributions

Grade Structure and Manning

AFSC	LT	CAP	MAJ	TOTAL
402X 401X	757	579	89	1425
55XX	579	563	309	1451
Pilot	---	---	---	±20,000

Assume lieutenants evenly divided between 1st and 2nd lieutenant

AFSC	2LT	1Lt	CAP	MAJ	TOTAL
402X 401X	378.5	378.5	579	89	1425
55XX	289.5	289.5	563	309	1451
Pilot	-----	-----	---	---	±20,000

Assignment Number

AFSC	1	2	3	4	5	6	TOTAL
402X 401X	567.75	382.25	193	222.67	29.67	29.66	1425
55XX	434.25	332.41	187.67	290.67	103	103	1451
Pilot	------	------	------	------	-----	-----±20,000	

Maximum p discounting 1st assignment

402X / 401X: $\frac{382.25}{1425} = 0.27$

55XX: $\frac{332.41}{1451} = 0.23$

Pilot assume 0.50

Calculation of Sample Sizes

let α =0.10
h =0.01

$$S^2(\bar{p}) = \left(\frac{.01}{1.645}\right)^2 = 3.7 \times 10^{-5}$$

402X, 401X

$$n = \frac{1425(.27 \times .73 + 3.0 \times 10^{-5})}{1425 \times 3.7 \times 10^{-5} + 27 \times .73} = 1124$$

$$\text{percent of population} = \frac{1124}{1425} \times 100 = 78.9\%$$

Draw 80% sample of 402X, 401X career fields

55XX

$$n = \frac{1451(.23 \times .77 + 3.0 \times 10^{-5})}{1451 \times 3.7 \times 10^{-5} + .23 \times .77} = 1113$$

$$\text{percent of population} = \frac{1113}{1451} \times 100 = 76.7\%$$

Draw 80% sample of 55XX career field

Pilot

$$n = \left(\frac{0.5 \times 1.645}{.01}\right)^2 = 6765$$

let h = 0.15

$$n = \left(\frac{0.5 \times 1.645}{0.15}\right)^2 = 3007$$

let h = .02

$$n = \left(\frac{0.5 \times 1.645}{.02}\right)^2 = 1691$$

$$\text{percent of population} = \frac{1691}{20,000} \times 100 = 8.5\%$$

Draw 10% sample of pilots

APPENDIX C

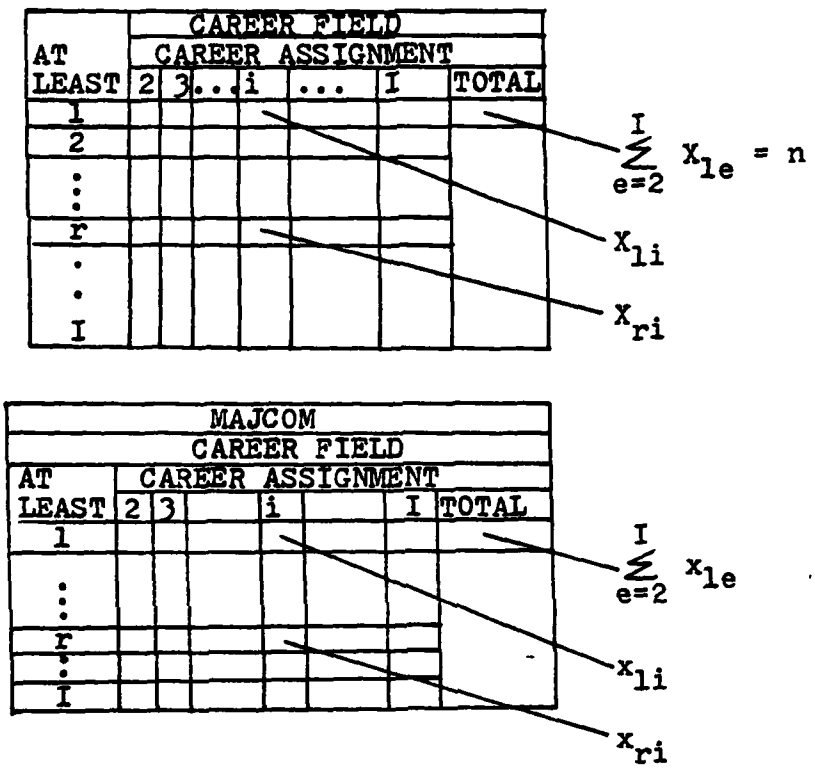
DEVELOPING CONFIDENCE INTERVALS FOR THE CONDITIONAL ASSIGNMENT PROBABILITIES

Each data set drawn for this research is stratified by the number of duty assignments in a career, independent of the first or current MAJCOM of assignment. However, to test the research hypothesis, the data must be segregated by the MAJCOM of initial duty. Probabilities relating to specific MAJCOMs must therefore be conditional on the initial duty assignment being in that MAJCOM. Figure C-1 illustrates the successive sorting of the data to establish the number of officers having spent at least r of i duty assignments in the MAJCOM of initial duty when the MAJCOM of initial duty is specified.

Equation 1 of Figure C-2 is the standard formula for calculating a population proportion and a confidence interval for that population (14). Equation 2 is that same formula expressed in terms of the data drawn independent of the MAJCOM of initial assignment.

Equation 3 is a conditional restatement of equation 2. The condition applied is that the initial duty assignment is in a specified MAJCOM.

Sorting Cases To Determine Assignment Probabilities



X = Cumulative number spending at least r of i assignments in the MAJCOM of Initial Duty

x = Cumulative number spending at least r of i in MAJCOM A given, that MAJCOM A was the MAJCOM of Initial Duty

$1 \leq r \leq I$
$2 \leq i \leq I$ where r and i are integers

N = Population Size
n = Sample Size
CP = Cumulative Probability
CL = Confidence Limit
CL_e = Conditional Confidence Limit

Figure C-1

Confidence Interval Formula

1. $CL = P \pm Z(1-\alpha/2)S(P)$

   where $P = \frac{x}{N}$

$$S(P) = \left((1-\frac{n}{N})(\frac{P(1-P)}{n-1})\right)^{\frac{1}{2}}$$

2. $$CL = \frac{xri}{n} \pm \left((1-\frac{n}{N})\left(\frac{xri}{n}\left(\frac{xri}{n}\ \frac{(1-\frac{xri}{n})}{n-1}\right)\right)\right)^{\frac{1}{2}} Z(1-\alpha/2)$$

$$CL_c = \frac{\frac{xri}{n} \pm \left((1-\frac{n}{N})\ (\frac{1}{n-1})(\frac{xri}{n})(1-\frac{xri}{n})\right)^{\frac{1}{2}} Z(1-\alpha/2)}{\frac{\sum_{e=2}^{I} x_{1e}}{n}\ \ \frac{x_{1i}}{\sum_{e=2}^{I} x_{1e}}}$$

thus

3. $$CL_c\ \ \frac{x_{ri}}{x_{1i}} \pm \left((1-\frac{n}{N})(\frac{1}{n-1})(\frac{x_{ri}}{n})(1-\frac{x_{ri}}{n})\right)^{\frac{1}{2}} \frac{Z(1\alpha/2)n}{x_{1i}}$$

Figure C-2

APPENDIX D

DEMONSTRATION OF DECISION CRITERIA APPLICATIONS FOR AMO CAREER FIELD

This appendix demonstrates the general methodology used to apply the decision criteria for inclusion of a record in the AMO population and use of assignments. Each figure presented here is a copy of an actual computer generated Duty and Performance History as received from AFMPC. Data extraneous to this demonstration such as beginning and ending duty dates, have been removed for space considerations. Points of discussion have been circled and numbered in the order of discussion. The decision criteria are:

1. Any duty assignment during which an officer held an AFSC of 323X, 404X, 403X, or 434X shall be considered an assignment to the 402X career field.
2. Any duty assignment during which an officer held an AFSC of 4011 below the grade of major shall be considered an assignment to the 4024 career field.
3. The sample of the population shall include the 402X assignment histories of majors currently holding a 4011 AFSC.
4. All Aircraft Maintenance Officer assignments to ADC shall be considered as assignments to TAC.
5. All Aircraft Maintenance Officer assignments to tactical airlift aircraft in TAC (such as C-130) shall be considered as assignment to MAC.

6. A duty assignment to a unified command (over seas command) shall be considered an assignment to the MAJCOM (MAC, TAC, SAC) having functional control of the aircraft unit to which the Aircraft Maintenance Officer is assigned.
7. All duty assignments to the 402X career field in MAJCOMs other than MAC, TAC, SAC, ATC, or a command that can be converted to one of these shall be considered an assignment to MAJCOM "other".
8. Career broadening assignments out of the 402X career field shall not be included in the assignment history of an Aircraft Maintenance Officer.

Referring to Figure D-1, Point 1 indicates the officer's basic AMO training and is thus discounted in the duty history. Point 2 indicates an assignment in ADC which, according to decision criterion 4, is counted as an assignment in TAC. Point 3 indicates an assignment in AFE, a unified command, to the 81st TFG which can be identified as a tactical fighter wing. This is counted as an assignment to TAC according to decision criterion 6. Point 4 shows an assignment to ATC as a student which is discounted according to criterion 8, since a student is considered to be operationally out of the career field. Point 5 shows an assignment to LOG, Logistics Command, which, according to criterion 7, is counted as an assignment to "other". This officer's record would be recorded as a three assignment

history, the first and second in TAC, and the third and current in "other".

Referring to Figure D-2, Point 1 is training and thus is discounted. Point 2 demonstrates the ADC-TAC criterion, number 4. During the assignment indicated by Point 2, the officer held an AFSC of 4034, which, according to criterion 1 is considered an assignment in the 402X field. During the assignment indicated by Point 3, the officer held an AFSC of 4011 which according to criterion 2, since this record belongs to a captain, is considered an assignment in the 402X field. During the assignment represented by point 4, the officer was on a career broadening assignment out of the field, and thus the assignment is discounted according to criterion 8.

A demonstration of decision criterion 3 is not included since this is a selection rule and treatment of assignment histories would not be altered. A demonstration of decision criterion 5 is not included since, despite anticipations, the situation rarely arose.

DAFSC	DUTY TITLE (CURRENT & HISTORY)		ID	DET	NBR	KIND	TYPE	LVL	LOCATION	
4024	F16 AVIONICS SYS LOG SP	5	LOG	0000	0000	AF ACQUISTION LOG	DIV	INTM	WRIGHT PATT	OHIO
4024	ASST TO DEPUTY PROG DIR		LOG	0000	0000	ACQUISTION LOG OP	DIV	INTM	WRIGHT PATT	OHIO
4024	ASST TO DEPUTY PROG DIR		LOG	0000	0000	ACQUISTION LOG OP	DIV	NAF	WRIGHT PATT	OHIO
4024	STU GRAD ACQUISTION LOG		ATC	SL00	0000	AF INST OF TECH	INST	MISC	WPIGHT PATT	OHIO
4011	MAINTENANCE SUPERVISOR	4	AFE	0000	0081	ORGANIZATION MAINT	SQ	SQ	BENTWATERS	UNKIN
4024	ASST MAINT SUPERVISOR		AFE	0000	0081	AVIONICS MAINT	SQ	SQ	BENTWATERS	UNKIN
4024	JOB CONTROL OFFICER		AFE	0000	0081	TACTICAL FIGHTER	WING	WING	BENTWATERS	UNKIN
4024	MAINTENANCE OFFICER	3	AFE	0000	0081	ORGANIZATION MAINT	SQ	SQ	BENTWATERS	UNKIN
4024	OIC FIELD MAINT		ADC	0000	0049	FIGHTER INTERCEPT	SQ	SQ	MAXWELL	N Y
4024	SQ SEF SCH REQD CRS		ADC	0000	0049	FIGHTER INTERCEPT	SQ		MAXWELL	ALA
4024	OIC FIELD MAINT		ADC	0000	0049	FIGHTER INTERCEPT	SQ	SQ	MAXWELL	N Y
4024	OIC FIELD MAINT		ADC	0000	0000	FIGHTER INTERCEPT	SQ	SQ		N Y
4024	OIC FLD MAINT	2	ADC	0000	0000	FIGHTER INTERCEPT	SQ	SQ		N Y
4024	OIC MAINT CON		ADC	0000	0000	FIGHTER INTERCEPT	SQ	SQ		N Y
4024	OIC MAINT CON		ADC	0000	0000	FIGHTER INTERCEPT	SQ	SQ		N Y
4021	OIC MAINT CON		ADC	0000	0000	FIGHTER INTERCEPT	SQ	SQ		N Y
4021	OIC MAINT CON		ADC	0000	0000	FIGHTER INTERCEPT	SQ	SQ		N Y
4021	OIC MAINT CON	1	ADC	0000	0000	FIGHTER INTERCEPT	SQ	SQ		N Y
4021	STU ACFT MAINT OFF CRS		ATC	0000	0000		SCH			ILL
0007	STU UNGRAD NAV TNG CRS		ATC	0000	0000	NAVIGATOR TRAINING	SQ			CAL

AMO DUTY HISTORY, EXAMPLE 1

FIGURE D-1

DAFSC	DUTY TITLE (CURRENT & HISTOR		D	DET	NBR	KIND	TYPE	LVL	LOCATION	
4024	SQ MAINTENANCE SUPERVI		[illegible]	0000	0057	COMPONENT REPAIR	SQ	UNIT	NELLIS	NEV
6611	A-10 WAPON SYSTEM OFFI		[illegible]	PNL	0000	SACRAMENTO ALC	CENT	NAF	MCCLELLAN	CAL
6611	A 10 LOGISTICS MANAGER	4	[illegible]	PNL	0000	SACRAMENTO ALC	CENT	NAF	MCCLELLAN	CAL
6624	A 10 LOGISTICS MANAGER		[illegible]	PNL	0000	SACRAMENTO ALC	CENT	NAF	MCCLELLAN	CAL
6621	A 10 LOGISTICS SUPPORT		[illegible]	PNL	0000	SACRAMENTO ALC	CENT	NAF	MCCLELLAN	CAL
6621	STU EWI LOG MGT AEROJET		[illegible]	EWTO	0000	AF INST OF TECH	INST		WRTGHT PATT	OHIO
4024	MAINTENANCE SUPERVISOR		SAC	0000	0376	FIELD MAINTENANCE	SQ	SQ	KADENA	JAPAN
4011	MAINTENANCE SUPERVISOR	3	SAC	0000	0376	FIELD MAINTENANCE	SQ	SQ	KADENA	JAPAN
4011	MAINTENANCE SUPERVISOR		SAC	0000	0376	FIELD MAINTENANCE	SQ	SQ	KADENA	JAPAN
4024	FLIGHTLINE		SAC	0000	0376	ORGANIZATION MAINT	SQ	SQ	KADENA	RYUKU
4024	ASSISTANT MAINTENANCE		SAC	0000	0376	ORGANIZATION MAINT	SQ	SQ	KADENA	JAPAN
4024	ORGN MAINT OFF		ADC	0000	0000	ORGANIZATION MAINT	SQ	SQ		COL
4024	ORGN MAINT OFF		ADC	0000	0000	ORGANIZATION MAINT	SQ	SQ		COL
4024	WORKLOAD CON OFF		ADC	0000	0000	AIR BASE	WING	BASE		COL
4024	WKLD CON OFF		ADC	0000	0000	AIR BASE	WING	BASE		COL
4024	WKLD CON OFF	2	ADC	0000	0000	CONSLD ACFT MAINT	SQ	SQ		COL
4024	WKLD CON OFF		ADC	0000	0000	CONSLD ACFT MAINT	SQ	SQ		COL
4024	WORKLOAD CON OFF		ADC	0000	0000	CONSLD ACFT MAINT	SQ	SQ		COL
4344	ASST RECIP ORG MAINT		ADC	0000	0000	CONSLD ACFT MAINT	SQ	SQ		COL
4344	OIC RECIP SEC,ORGL		ADC	0000	0000	CONSLD ACFT MAINT	SQ	BASE		COL
4341	TNG-ANLYS OFF		ADC	0000	0000	CONSLD ACFT MAINT	SQ	SQ		COL
4341	WORKLOAD CON OFF		ADC	0000	0000	CONSLD ACFT MAINT	SQ	BASE		COL
4341	STU ACFT MAINT CRS	1	ATC	0000	0000		SCH			LLL

AMO DUTY HISTORY, EXAMPLE 2

FIGURE D-2

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